AL/OE-TR-1994-0136

LABORATORY SERVICES GUIDE

A R M S T R O N G

L A B O R A T O

19951025 004

OCCUPATIONAL AND ENVIRONMENTAL
HEALTH DIRECTORATE
Brooks Air Force Base, TX 78235-5114

October 1994
Supercedes AFOEHL Sampling Guide 1989

Approved for public release; distribution is unlimited.

AIR FORCE MATERIEL COMMAND
BROOKS AIR FORCE BASE, TEXAS

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ERIK K. VERMULEN, Col, USAF, BSC
Director, Occupational and
Environmental Health Directorate

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	October 94	Final

4. TITLE AND SUBTITLE
Laboratory Services Guide

5. FUNDING NUMBERS

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Armstring Laboratory
Occupational and Environmental Health Directorate
Brooks AFB, TX 78235-5114

8. PERFORMING ORGANIZATION REPORT NUMBER
AL/OE-TR-1994-0136

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Supercedes AFOEHL Sampling Guide 1989
Forward comments/corrections to Lt Col Victoria Dunovant 210-536-3626 (DSN: 240-3626)

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The Armstrong Laboratory, Occupational and Environmental Health Directorate, Laboratory Services Guide (LSG), (commonly referred to as the Sampling Guide), outlines services provided to the customer by the various divisions, including consultations, surveys and sample analysis. The LSG contains five (5) sections: (1) Introduction to Services, (2) Environmental Chemistry, (3) adiation Related Services, (4) General Information and (5) Industrial Hygiene/Occupational Health. Also Included is a forms section and a price list for analytical chemistry testing.

14. SUBJECT TERMS
Services Guide, Sampling Guide, Environmental, Occupational, Industrial Hygiene, Radiological, Biological

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF THIS PAGE	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

Laboratory Services Guide

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ARMSTRONG LABORATORY SUPPORT SERVICES
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE (OE)

In late 1991 the Air Force's laboratory system was restructured into four "Super Labs" and as part of this action the Occupational and Environmental Health Laboratory (OEHL) was merged with research and development organizations in Environment, Safety and Occupational Health (ESOH) to become the Armstrong Laboratory Occupational and Environmental Health Directorate (AL/OE). The old OEHL has become integrated to provide customers with "cradle-to-grave", full service. As part of the Armstrong Laboratory and our parent organization , the Human Systems Center, we provide total support to the human in Air Force systems. The five Armstrong Laboratory product lines include: crew systems technology; manpower, personnel, training and logistics research; aerospace medicine; environmental engineering research; and occupational and environmental health.

Our Occupational and Environmental Health Directorate is composed of a multidisciplined team organized to provide risk assessment services for Air Force operations. We provide support to the operational commanders to ensure their forces are available and combat effective. Our technical service divisions provide exposure assessment services and risk characterization assessments, while our research divisions provide the basic criteria for biological effects and dose response estimation. We are organized with nearly 240 people supporting the functions of analytical services, bioenvironmental engineering services and occupational health; another 140 people support research in toxicology, laser bioeffects and radiofrequency bioeffects. In addition, we have 80 Army and Navy personnel collocated with us and nearly 100 on-site contractors supporting our operations. To further serve our customers, we have contract vehicles that we use to provide customer funded support, used for about 250-300 tasks per year at a value of $30 - 50 million per year.

Our goal is to provide the Air Force and other DOD agencies complete, one-stop risk assessment and risk management services. We have initiated a quality assurance format to track our performance with respect to the customer's expectations in responsiveness, accuracy and intensity; last year we won the Chief of Staff's Team Quality Award but that was just the start of our initiatives. We have targeted to provide top quality services at 80% of comparable commercial rates. Your evaluation of our performance is important to us.

In our world its the customer who determines our future direction. You control what topics are researched and how much is budgeted for both research and support services. Annually an ESOH needs survey is conducted with the MAJCOMs; if you've identified a research need and desire help in formalizing it, let us help. The centrally funded research budget is significantly impacted by the operational requirements expressed by you, our users. Likewise, if you need help in planning your input to the environmental compliance, pollution prevention, or conservation budget estimates and financial plans, call us. The same goes for inputs to the occupational safety and health financial plans. Our technical services are evolving to a fee for service format; each base must forecast its budget needs to ensure both your base program and any support you desire from us is included in the base level request. Our ability to keep our doors open and to continue to provide you services is dependent on your planning - let us help you where we can!

ERIK K. VERMULEN, Col, USAF, BSC
Director

Armstrong Laboratory (AL)
Occupational and Environmental Health Directorate (OE)
Analytical Services Division (OEA)

The Analytical Services Division (OEA) has, for many years, provided fixed-based analytical support to Air Force bases and MAJCOMs worldwide. The lab responds to over 250 base-level customers who send over 75,000 samples per year. These samples include occupational and environmental hazards contained in air, water, soil, vegetation and industrial materials. The lab personnel also provide consultation for interpretation of results and analytical expertise. The laboratory is certified by the American Industrial Hygiene Association (AIHA) as well as all nine EPA Regions and over 40 individual states to perform analytical chemistery testing. The Analytical Services Division also maintains contractual agreements with over 10 other labs throughout the US and overseas to handle special problems and projects. Each of these contract labs are closely monitored for their quality and applicable state and national certifications.

There are three seperate branches within the Analytical Services Division:

Environmental Chemistry Branch

Occupational Chemistry Branch

Technical Operations Branch

The entire Division can be reached using one phone number. From this central number, an individual, a section or customer service is paged for you.

DSN 240-3626	Commercial (210) 536-3626
FAX 240-9043	FAX Commercial (210) 536-9043

Address: AL/OEA
2402 E Drive
Brooks AFB, TX 78235-5114

E-Mail: LASTNAME@ OEHL.BROOKS.AF.MIL
(Insert the last name of the individual in place of LASTNAME, or use ECS for the generic account and we will route appropriately.)

Points of Contact
Analytical Services Division
AL/OEA

Listed below are the names and functional areas of expertise of key personnel you may need to contact within OEA. Refer all of your technical questions / comments to us. However, if you are seeking sample results, please ask for a Customer Service Representative.

Lt Col Kenny D. Locke	Division Chief
Dr George Lee	Executive Manager
MSgt Mike Wantland	Division Superintendent

Technical Operations Branch

Mr Leo Jehl	Chief, Technical Operations
MSgt Tim Hoeflich	NCOIC/State Forms/State Certificates
MSgt Tae Parrish	Direct Shipments/Complaints/ Customer Service
Ms Ruth Delgado	Contract Review Chemist
Ms Tammy Hollis	Review Chemist
MSgt Tim Hoeflich	State Forms, State Certification
TSgt Debbie Wedley	Certifications

Occupational Chemistry Branch

Mr Andrew Richardson, III	Chief, Occupational Chemistry Branch/Priorities
TSgt Ray Briones	NCOIC
Mr Kurt Greebon	Industrial Hygiene
Ms Doris Tessmer	Asbestos (Air and Bulk)
Mr William Neal	Commercial Products
Mr Russell Lundy	Occupational Metals

Environmental Chemistry Branch

Lt Col Victoria Dunovant	Chief, Environmental Chemistry Branch/Priorities
TSgt Dan Thompson	NCOIC
Mr Duryl Bird	Inorganics
Mr Gerald Wittenbach	Environmental Metals
Mrs Wissam Aboul-Saad	Volatiles
Mr Tony Forjohn	GC/MS
Capt Ruth Weddell	Fuels/GC-MS
Mr Dennis Mark	Pesticides/Trace Organics
Ms Susan Smith	Residue-Pesticides/PCBs

Environmental Chemistry Branch
AL/OEAE (Lt Col Victoria Dunovant)
DSN: 240-3626 COMM: 210-536-3626
FAX: 240-9043
E-mail: DUNOVANT @ oehl.brooks.af.mil

The Environmental Chemistry Branch provides quantitative analysis of drinking water, wastewater, soil and hazardous waste. We are divided into eight (8) distinct functions:

Inorganics
Environmental Metals
Volatiles
GC/MS
Fuels - GC/MS
Pesticides
Residue/PCB/Pesticides
Hazardous Waste

We provide primarily in-house analyses. However, we also utilize AFMC Environmental Lab Cooperative (ELC) and over ten (10) certified contract labs located throughout the U.S. and overseas.

Our goal is to provide you - the customer, with accurate and timely analytical results.

The environmental section of this services guide is a comprehensive list of regulated chemicals and their respective methodologies to aid you in sampling and requesting the appropriate analyses. We hope this guide and our services will make environmental compliances easier to understand and attain. Please feel free to contact us if we can be of any help.

Occupational Chemistry Branch (AL/OEAO)

The Occupational Chemistry Branch provides qualitative and quantitative analysis of air, soil, water and biological samples in support of Air Force Occupational Health Programs. The Occupational Chemistry Branch is comprised of four distinct functions listed below.

Industrial Hygiene	<Air solvents, silica, isocyanates>
Asbestos	<Air & bulk samples>
Occupational Metals	<Air metals, paint chips, bulk metals swipes, and occupational biological samples>
Commercial Products	<Compressed gases, infra-red analysis, other unknowns>

Our laboratory is continually upgrading instruments and equipment to provide lower detection limits. Our analytical staff is well trained to provide you (our customers) accurate, reliable, and timely results at a cost vastly lower than civilian contract laboratories.

A comprehensive listing of analysis performed by our laboratory is provided, including CAS numbers, collection and analysis methods, minimum and/or maximum sample volumes required to perform analysis and applicable sample holding times.

It is hoped that this new, updated version of the sampling guide will provide information which will enhance and improve sample collection.

Turnaround Time Policy

Samples received in the Analytical Services Division are analyzed within 21 working days. Every attempt is made to analyze all samples in-house. However, if this is not possible, AFMC Environmental Cooperative Labs (ELC) and certified contract laboratories will assist OEA. Our goal is to make our services efficient enough that priority analysis is necessary only under unusual circumstances.

POINTS OF CONTACT
BIOENVIRONMENTAL ENGINEERING DIVISION

OEB (DSN: 240-3305)
Lt Col Jim Montgomery

OEBA - Radioanalytical Branch (DSN: 240-2061)
Mr Clay

OEBD - Radiation Dosimetry Branch (DSN: 240-3486)
Maj Donovan

OEBN - Noise Effects Branch (DSN: 785-3664)
Mr Robert Lee

OEBQ - Hazardous Materials Risk Management Branch (DSN: 240-3305)
Maj Goddard

OEBW - Water Quality Branch (DSN: 240-3305)
Capt Schmidt

OEBY - Air Quality Branch (DSN: 240-3305)
Capt Sylvia

OEBZ - Health Physics Branch (DSN: 240-3486)
Capt Hicks

Bioenvironmental Engineering Division (OEB)
LTC Jim Montgomery

Provides environmental engineering support and research to the Air Force worldwide, in air, water and waste monitoring, aircraft noise abatement, pollution prevention and hazardous material management. This includes measuring, interpreting and assessing the risk of on- and off-installation environmental and human health impacts resulting from past or present Air Force operations. This expertise extends to virtually all types of environmental chemical, radiological and physical agents characterized as noxious, infectious, toxic or hazardous found or propagated in soil, ambient air, surface or subsurface waters, industrial waste streams and associated ecosystems with potential pathways of human exposure, risk or impact.

Responsible for the Air Force Radiation Assessment Team (AFRAT) - the Air Force Medical Service's primary worldwide response team for nuclear weapon accidents/incidents. The division solves these Air Force environmental concerns through professional consultation, specialized laboratory services, basic and applied research or on-site technical support using organizational, host installation and contractor resources.

HAZARDOUS MATERIALS RISK MANAGEMENT CONSULTATION
AL/OEBQ (MAJOR GLENN A. GODDARD)
DSN 240-3305
E-mail: GODDARD@OEHL.BROOKS.AF.MIL

Background: The Hazardous Materials Risk Management Branch consults with Air Force bases on the identification and correction of environmental problems related to hazardous waste management. Our efforts are aimed at compliance with Resource Conservation and Recovery Act (RCRA) requirements, as well as focusing on opportunities for source reduction of hazardous wastes.

Applicable Regulations:
AFI 32-7042, Environmental Quality, Solid & Hazardous Waste Compliance
AFI 19-40, Instruction for The Pollution Prevention Program
AFI 48-119, Instruction for Medical Service Environmental Quality Programs
AFPD 32-70, Environmental Quality
AFP 19-32, Air Force Hazardous Waste Management Guide
40 CFR 241, Guideline for the Land Disposal of Solid Waste
40 CFR 243, Guideline for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258, Criteria for Municipal Solid Waste Landfills
40 CFR 261, Identification and Listing of Hazardous Waste

AL/OE Services Provided: Give us a call to access the services listed below.

1. Hazardous Materials Surveys. We have the capability and responsibility to perform hazardous materials surveys at active duty Air Force, Air Force Reserve, and Air National Guard bases world-wide. We provide scientific and engineering risk assessment assistance in sampling hazardous waste stream sources, pollution prevention and control technologies, and source reduction procedures and practices. We provide scientific and engineering assistance to bases to help resolve problems with the prevention, reduction, control disposal, and treatment of solid, hazardous, or infectious wastes under RCRA. We also act as a liaison with the U.S. Environmental Protection Agency to ensure that Air Force operations are in compliance with RCRA requirements.

2. Contract Oversight. Utilizing on-line contractors, we maintain scientific and technical oversight of the following representative contract efforts: Pollution Prevention Programs; Environmental Assessments; Hazardous Waste Surveys; Environmental Impact Action Plans and Statements; Refuse Disposal; Waste Petroleum Oil and Lubricant Recoveries; Hazardous Waste Management Unit Closures; Used Oil Burner Test Programs; Hazardous Waste Management Tracking Systems; and Soil Contamination Studies.

3. Telephone Consultations. We have the expertise to field inquiries on the following subjects:

Airplane Crash Site Assessments
Airplane Mishaps involving Hazardous Materials
Chemical Substitutions
Ecological Assessments
Hazardous Materials Characterizations
Hazardous Materials Risk Assessments
Hazardous Materials Prevention Guidance
Hazardous Materials Sampling, Monitoring, and Shipping Techniques
Input to HQ USAF Hazardous Material Regulations
Landfill Permitting

Lead Characterizations of Building Materials Prior to Demolition
Material Safety Data Sheet Requests
Medical Waste Disposal Practices
Mixed Waste Characterizations
Notice of Violations Consultations
Regulatory Interpretations (RCRA and others)

AIR QUALITY CONSULTATION
AL/OEBY (CAPT DENNIS A. SYLVIA)
DSN 240-3305
E-mail: SYLVIA@OEHL.BROOKS.AF.MIL

Background: The Air Quality Branch offers consultation on air quality issues to Department of Defense facilities worldwide. We provide scientific and engineering assistance on such topics as: pollution prevention, air emission inventories, industrial source emission inventory testing, control technologies, source reduction procedures and practices, and air dispersion modeling. We also act as a liaison to regulatory agencies to ensure that Air Force operations are in compliance with federal, state and local regulatory requirements.

Applicable Regulations:

AFI 32-7040, Air Quality Compliance
40 CFR 50, National Primary and Secondary Ambient Air Quality Standards
40 CFR 53, Ambient Air Monitoring Reference and Equivalent Methods
40 CFR 60, Standards of Performance for New Stationary Sources
40 CFR 61-63, National Emission Standards for Hazardous Air Pollutants
40 CFR 70, State Operating Permit Programs
40 CFR 81, Designation of Areas for Air Quality Planning Purposes
40 CFR 82, Protection of Stratospheric Ozone

AL/OE Services Provided: Call and ask for an Air Quality consultant for any of the services listed below.

1. Source Emissions Testing. We have extensive experience in source emissions testing. We offer an extensive in-house or contract emissions testing capability to establish baseline emission or to meet compliance sampling requirements. Recently tested emission sources include: medical waste incinerators, central heat and power plants, chrome plating facilities, paint spray booths, and other point emission sources.

2. Consultation. We provide telephone, written, or on-sight consulting services to bases needing assistance. Our extensive environmental library and access to several national environmental data bases give us ready access to up-to-date rules and regulations and proposed regulatory changes that may affect your base.

3. Regulatory Modeling. We have numerous regulatory dispersion models and can perform in-house regulatory dispersion modeling to meet your needs. Regulatory modeling services also can be provided through our on-line contractors. The on-line contractors have extensive regulatory modeling experience (permit renewals, SubPart X Open Burning/Open Detonation Permits, NSPS, fire training operations, conformity analyses, risk assessments, etc.).

4. Contract Oversight. We have on-line contractors available to provide air quality services to customers worldwide. We provide technical oversight on any air quality project to include: air emission inventories, source emission testing, regulatory and engineering dispersion modeling, risk assessments, pollution prevention, air toxics quantification and reporting, and air monitoring. On line contractors are familiar with the Clean Air Act (including TITLE V Operating Permit Requirements and New Source Performance Standards), Emergency Planning Community Right-to-Know Act (EPCRA), National Environmental Policy Act, and the Resource Conservation and Recovery Act.

WATER QUALITY CONSULTATION
AL/OEBW (CAPT FRANZ SCHMIDT)
DSN 240-3305, FAX DSN 240-3945
E-mail: SCHMIDT@OEHL.BROOKS.AF.MIL

Background: The Water Quality Branch provides Air Force bases with scientific and engineering assistance in water quality monitoring, water treatment techniques, and consultative support in environmental compliance. We develop Technical Reports (TRs) and Consultative Letters (CLs) that guide users in maintaining compliance with CWA and SDWA. In addition, we provide information and guidance to our customers concerning new regulations in the water quality arena.

Applicable Regulations and Guidance:

AFI 32-7041,	Water Quality Compliance
AFI 32-7045,	Environmental Compliance Assessment and Management Program
AFOSH Std 48-44,	Management of the Drinking Water Program
AFPD 32-70,	Environmental Quality
40 CFR 122.26,	Storm Water Discharge
40 CFR 125,	Criteria and Standards for the National Pollutant Discharge Elimination System
40 CFR 131,	Water Quality Standards
40 CFR 141-142,	National Primary Drinking Water Regulations
40 CFR 143,	Secondary Drinking Water Regulations
40 CFR 403,	General Pretreatment Regulations for Existing and New Sources
40 CFR 503,	Sludge Rules
AL-TR-1991-0049	Water Vulnerability Assessments
AL-TR-1991-0075	A BEE Guide to Complying with the Safe Drinking Water Act
EPA-505-8-91-002	Guidance Manual for the Preparation of NPDES Permit Applications for Storm Water Discharges Associated with Industrial Activity.
AL-HB-1992-0002	Handbook for Sampling and Sample Preservation of Water and Wastewater

AL/OE Services Provided: Call and ask for a Water Quality consultant for any of the services listed below.

1. Wastewater Characterization Surveys. We have extensive experience in performing complete characterizations of active duty Air Force, Air Force Reserve, and Air National Guard installation discharges. Utilizing totally in-house resources, we perform all necessary sampling to: determine sources of toxic discharges to wastewater collection systems; do performance evaluations and troubleshooting of wastewater treatment plants; and do oil/water separator studies. Surveys are designed to assess the level of compliance with existing or proposed NPDES wastewater permits and the Industrial Pretreatment Standards under the Clean Water Act. Air Force customers pay only for direct costs, not for labor, resulting in substantial savings over contracting out the same work.

2. Safe Drinking Water Act Surveys. We perform surveys of drinking water systems to determine causes of, and solutions to contamination problems resulting from bacteria, biofilms, taste and odor, disinfection by-products, synthetic organics, radiological isotopes, and lead and copper. The customer is given a field report noting the findings and solutions developed.

3. Contract Technical Oversight. Using on-line contractors, we provide professional, technical oversight of contract environmental services, to include: Storm Water Pollution Prevention; Lead and Copper Desktop Evaluations and Demonstration and Testing; Drinking Water Cross Connection Surveys; Operation Maintenance Training and Assistance Program (OMTAP) Evaluations; Toxicity Identification/Reduction Evaluations (TRE/TIEs); and Water Reuse Studies.

4. Telephone Consultation. We can support a wide range of inquiries, from basic water sampling questions, to detailed database searches on complicated issues. Results of consults that are thought to be important to the field in general are published in the AL/OE Newsletter.

POINTS OF CONTACT
OCCUPATIONAL MEDICINE DIVISION (OEM)

OEM (DSN: 240-3491)
Col Mark Stokes

- Occupational Physicians (Col Gould/Maj O'Neal)

OEMB - Environmental Biology Branch (DSN: 240-2063/64)
Lt Col Baker

- Hazardous Material Information System (Ms Willis)
- Medical Entomology (Dr McHugh)
- Ecology and Bioassay (SrA Garrett)

OEMH - Health Assessment Branch (DSN: 240-2063/64)
Maj Larcom

- Health Risk Assessment (Capt Weisman)
- Toxicology (Mr Hinz)
- Health Standards (Mr Hinz)
- Rapid Response (Capt Weisman)
- Ecological Risk Assessment (Maj Larcom)

OEMI - Industrial Hygiene Branch (DSN: 240-3214/15)
Lt Col Hollenbeck

- General Industrial Hygiene (Lt Col Hollenbeck, Mr Langwell, Capt Boyle)
- Noise Hazards and Vibration (Capt Groth/Mr Wells)
- Lead Base Paint (Capt Mukoda)
- Asbestos (Capt Ghattas)
- Exposure Assessment (Capt Boyle/Capt Bell)
    - Indoor Air Quality
    - Sampling Methods
- Equipment Loan (SSgt King)

OEMO - Occupational Health Branch (DSN: 240-2063/64)
Maj Fisher

- Occupational/Environmental Epidemiology (Maj Grayson)
- Occupational Illness Data Registry (Capt Cogburn)
- Ergonomics (Maj Fisher)
- Electronic Bulletin Board (TSgt Voronin)
- Hearing Conservation Data Registry (Maj Schulz)

OCCUPATIONAL MEDICINE DIVISION SERVICES
AL/OEM (COLONEL MARK STOKES)
DSN 240-3491

The Armstrong Laboratory Occupational Medicine Division (AL/OEM) is organized to meet all the specialized occupational health needs of Air Force operations. We have on staff Occupational Medicine physicians, Military Public Health (MPH) Officers, Bioenvironmental Engineers (BEE) that are Certified Industrial Hygienists, toxicologists, an audiologist, an entomologist, and a number of BEE and MPH technicians.

When we recognize an Air Force need concerning an occupational health issue, we develop a Program to manage the support our customers will require. Programs we currently manage are listed on the next page. Specific information on each Program is described on the following pages. Program managers are listed with their phone numbers and e-mail addresses. In general, for each Program we provide the following levels of support to BEE and MPH offices AF-wide:

LEVEL 1: We prepare technical guidance in the form of Technical Reports (TRs) or Consultative Letters (CLs) that should provide base-level personnel the knowledge necessary to resolve many issues on their own. Current TRs and CLs are referenced in the program descriptions. To obtain one or two TRs or CLs, you may call the STINFO officer at DSN 240-3421. If you have a longer list, please request them from: AL/OEPP (STINFO), 2402 E Drive, Brooks AFB, TX 78235-5114, or fax the list to DSN 240-3874. If you have an idea for technical guidance that would be of interest to many Air Force bases, but which is not covered under a current TR or CL, please contact a program manager to share your idea.

LEVEL 2: We provide services such as the PEGASUS Bulletin Board, Equipment Loan, and data-bases which provide a cost-effective means to share experience, instruments, data, and other resources.

LEVEL 3: We provide off-site consultation via telephone, e-mail, or the PEGASUS bulletin board.

LEVEL 4: We provide on-site consultation for short periods of time (one day to two weeks) when Levels 1-3 fail to produce a solution.

LEVEL 5: We administer time and materials contracts for virtually any type of occupational health need, including industrial hygiene exposure assessments, ergonomics, indoor air quality, ecological risk assessments, review of toxicology literature, asbestos characterization studies, and lead-based paint characterization studies. We recommend this avenue for projects that require a significant amount of time on-site or when a large amount of data collection and analysis is anticipated. All contracts must be funded by the customer. A contract can usually be on line in 8-12 weeks once we receive a clear statement of work and a fund transfer from the customer. It is essential that a customer carefully analyze their needs before requesting a contract, because a change in the scope of work during the negotiation phase can cause significant delays and frustration to all parties involved.

Our manpower resources are limited, so we must rely on our customers to do everything they can to resolve occupational health issues using their base resources, supplemented by our off-site consultation services (Levels 1-3). If this effort fails, then we are prepared to provide Level 4 on-site consultation or Level 5 contract support.

To request a survey team or contract, send a letter of request to us
(AL/OEM, 2402 E Drive, Brooks AFB, TX 78235-5114) through your MAJCOM BEE (copy to HQ AFMC/SGB). Send MPH requests directly to us with a copy to your MAJCOM. The letter must

identify the base point of contact responsible for coordinating all aspects of the project with our consultant. The letter of request should also provide background information on the problem to be evaluated and identify other parties that have an interest in the outcome. Please fax us (DSN 240-2315) a copy of the formal request and call the Program Manager to give us a head start on planning and scheduling.

As soon as a decision is made to provide on-site consultation, our goal is to schedule and perform an on-site survey within two months. However, we often have a schedule backlog which requires us to prioritize requests. Factors we consider when we prioritize include: the complexity and length of the project; the applicability of the project to other Air Force bases (i.e., if the experience gained improves our ability to advise other bases, the priority is higher); the level of effort already put forward by the base (more effort means higher priority); and, if the customer offers to pay the TDY costs (yes, our budget is getting tighter, too).

<u>Occupational Medicine Division Programs</u>:

Ecology and Bioassay Laboratory
Environmental Microbiology Laboratory
Medical Entomology

HMIS (Hazardous Materials Information System)
HCDR (Hearing Conservation Data Registry)

PEGASUS Bulletin Board

Environmental Sciences Consultation
- Health Assessment Assistance
- Health Consultation/Rapid Response
- Health Standards
- Risk Communication
- Toxicology

Industrial Hygiene Consultation
- Asbestos
- Indoor Air Quality
- Lead-Based Paint
- Noise and Vibration Hazards

Equipment Loan

Occupational Health Consultation
- Ergonomics
- Occupational/Environmental Epidemiology

Occupational Medicine Consultation

ECOLOGY AND BIOASSAY LABORATORY
AL/OEMB (SrA Garrett)
DSN 240-3305
E-mail: HARRIS@OEHL.BROOKS.AF.MIL

Background: The Ecology and Bioassay Laboratory provides aquatic and terrestrial bioassay testing to detect the presence of toxic materials in the environment. Aquatic bioassays use living organisms (fish, Daphnia sp., algae, etc.) to assess the toxicity of water soluble materials. Terrestrial bioassays use plants to assess the toxicity of soil from contaminants such as fuels and herbicides.

Aquatic Bioassays:

1. NPDES: The EPA uses bioassay data to determine if certain AF facilities are in compliance with the National Pollutant Discharge Elimination System (NPDES) Permit Program. This program is driven by the Federal Water Pollution Act Amendments of 1972, the Clean Water Act (CWA) of 1977 and the Water Quality Act of 1987. Its primary purpose is to ensure that discharge of toxic substances in toxic amounts to surface waters is prohibited.

2. Fish Kills: Aquatic bioassays can be used to assist in fish kill investigations. Fish kills on most Air Force installations are rare and usually not very severe, however, the fact that a fish kill occurs can be extremely important. At the least, a fish kill is an indication that there is an environmental problem on the base that could result in adverse publicity for the Air Force. At the worst, the fish kill could be the first obvious sign of severe environmental contamination. A thorough and complete investigation of a fish kill can possibly identify environmental problems on the base, many of which can be remedied. If the investigations are not performed, the possibility of future contamination of a greater extent increases.

Terrestrial/Soil Bioassays: Soil bioassays can be used to evaluate the acute effects of either herbicide or jet fuel contamination on plant growth. The 14-day laboratory procedure provides an indication of chemical toxicity to vegetation in the vicinity of the spill. In addition, follow-up bioassays at 6, 12 and 18 months after the initial contamination incident can be used to monitor the soil recovery process. This will also provide an indication of when replanting operations can begin.

AL/OE Services Provided:

1. NPDES: One of the primary functions of the Ecology and Bioassay Laboratory is to support bases with NPDES Permits. If you have a bioassay requirement and would like our laboratory to perform your bioassay testing, please contact us as soon as you become aware of your requirement and/or receive your NPDES permit. Turn to Water Quality Consultation for information on NPDES consultation services available.

2. Fish Kills:

a. As soon as you detect a fish kill, it is essential that you collect as much of the following data as possible: pH, dissolved oxygen and temperature at various depths of the pond or lake.

b. Collect as much background information as possible, such as date and time of fish kill, weather conditions prior to fish kill, number of dead or dying fish, and any knowledge of chemical usage in the area.

c. Please contact us for sampling instructions prior to sending water samples for bioassay testing.

d. If chemical analysis or fish tissue evaluations are being considered during the investigation of a fish kill, please contact Lt Col Dunovant or MSgt Parrish of the Analytical Services Division (AL/OEA), DSN 240-3626, prior to sampling for instructions.

3. Terrestrial Bioassays: Please contact us for sampling instructions prior to submitting soil samples for bioassay testing. For chemical analysis of samples, contact Lt Col Dunovant or MSgt Parrish for sampling instructions.

MEDICAL ENTOMOLOGY FUNCTION
AL/OEMB (DR CHAD P. McHUGH)
DSN 240-2063
E-mail: MCHUGH@OEHL.BROOKS.AF.MIL

Objectives: The Medical Entomology Function provides consultations, on-site surveys, arthropod identifications, and teaching in support of USAF preventive medicine and environmental compliance programs.

Applicable Regulations:

AFI 48-102, Aerospace Medicine, Medical Entomology Program
AFR 91-21, Real Property Operation and Maintenance, Pest Management Program
AFR 91-22, Real Property Operation and Maintenance, Aerial Dispersal of Pesticides
AFR 161-4, Medical Service, Quarantine Regulations of the Armed Services

MPHO Responsibilities: Installation MPHO's should conduct routine surveillance to monitor the activity of pest and medically-important arthropods. Surveillance data should be forwarded to installation CE pest management personnel and used to guide control efforts. When unusual circumstances arise, MPHO's should request consultations and on-site surveys, or initiate requests for aerial spray as appropriate.

Civil Engineering Responsibilities: Installation CE pest management personnel should employ all available control measures, including biological and physical measures, to manage pest and medically-important arthropods in the most timely, efficacious and environmentally-sensitive manner possible.

AL/OE Services Provided:

1. Consultations, On-site Surveys, Aerial Spray Validations: Call or send a letter of request to AL/OEMB, 2402 E Dr, Brooks AFB, TX 78235-5114.

2. Routine Arthropod Identifications: Submit by mail or in person. All specimens should be accompanied by appropriate collection data including a POC, address, and DSN phone number. Clinical specimens (i.e., ticks, lice, fleas, and mites collected off personnel) should be sent with a miscellaneous laboratory request slip or other document which can be returned and included in the patient's medical jacket.

HAZARDOUS MATERIAL INFORMATION SYSTEM (HMIS) PROGRAM
AL/OEMB (GS-11, ANNA L. WILLIS)
DSN 240-3214
E-mail: WILLIS@OEHL.BROOKS.AF.MIL

Background: The principal purpose of the Armstrong Laboratory HMIS focal point is to provide Air Force support to the central DoD system for the collection, review, and dissemination of data contained on Material Safety Data Sheets (MSDSs). As one of eight major focal points, we provide critical information on health and safety to comply with Federal laws. The overall DoD program manager is Defense Logistics Agency (DLA). Since 1979 HMIS has been a ready source of information for Industrial Hygiene assessments, Hazard Communication (HAZCOM) training, Pollution Prevention, Hazardous Waste Minimization (HAZMIN), and other initiatives which impact on BEEs.

Applicable Regulations:

DODI 6055.1 DoD Occupational Safety and Health Program
DODI 6050.5 Hazardous Material Information System
AFR 71-9 Air Force Packaging,
  Chapter 14 Hazardous Material Information System (HMIS)
AFOSH Standard 161-21 Hazard Communication
AFMCR 71-1 AFMC Packaging and Materials Handling Policies
  and Procedures, Chapter 9 Hazardous Materials
AF FAR SUP 52.223-9001, 52.223-9002 Material Safety Data Sheets

BEE Responsibilities:

1. Search the current edition of the HMIS-CD for any MSDS data needed.
2. Obtain missing MSDSs and submit a copy to us for input into HMIS.
3. Monitor and advise other work centers of the availability of the HMIS-CD for their use.

AL/OE Services Provided:

1. We support HAZMIN initiatives to reduce hazardous materials in the inventory and Pollution Prevention control efforts (CFCs, EPA Toxics Release Inventory), by providing special reports indexed by National Stock Number (NSN) and Chemical Abstract Service (CAS) number. Please call us for special instructions.

2. The DODL6050.5-CD publication is available to all offices at no cost. Contractors may receive the DODL6050.5-CD, but they must submit an approval letter signed by their Air Force contracting officer. The DOD*LR*6050.5-CD publication contains proprietary or trade secret ingredient information. Distribution of this publication is restricted to the Bioenvironmental Engineer (BEEs) or other offices (i.e. Environmental Waste, Environmental Management or HAZMAT Pharmacy) which require proprietary ingredient information. To be placed on requirement indicate the publication desired, DODL6050.5-CD or DOD*LR*6050.5-CD, in a letter of request with your complete organizational address including street address (Bldg number or unit number for APO addresses), and 9-digit zip code to: HMIS, AL/OEMB, 2402 E Dr, Brooks AFB TX 78235-5114. You may FAX your request to: DSN 240-2315 or commercial (210) 536-2315.

3. We can provide support in obtaining current MSDSs when they are missing from shipments, illegible, or of poor quality. Please try to contact the company for a proper MSDS first, however, as we have only one person here to support your requests.

HEARING CONSERVATION DATA REGISTRY

AL/OEMO(HCDR) (MAJOR THERESA SCHULZ)
DSN 240-2909
E-mail: SCHULZ@OEHL.BROOKS.AF.MIL

Objectives and Mission of the HCDR: The purpose of the USAF Hearing Conservation Program (HCP) is to detect noise induced hearing loss before it becomes a communication handicap. To accomplish this, the HCDR section is set up to manage one of the largest hearing conservation databases in the nation. We provide consultant services to our base level customers, plus we identify problems with the USAF HCP and make recommendations regarding the program.

Applicable Regulations:

AFOSH Standard 161-20, Hearing Conservation Program
AFOSH Standard 48-19, Hazardous Noise Program
29 CFR 1910.95, Occupational Noise Exposure

MPH Responsibilities: The base level MPHO ensures that all personnel identified as being exposed to hazardous noise are enrolled in the audiometric monitoring program of the USAF Hearing Conservation Program (HCP). Other duties include tracking compliance with the HCP, providing job capabilities assessments, and fitting and dispensing approved hearing protection devices (HPD), as defined in AFOSH Standard 161-20.

BEE Responsibilities: The BEE performs noise surveys and dosimetry, advises shop supervisors and the Aerospace Medicine Council of results, provides the noise survey and dosimetry results to the MPH, and advises on proper HPDs, as defined in AFOSH Standard 161-20.

AL/OE Services Provided (See also **Noise and Vibration Hazard Assessment**):
The strategy of the HCDR is to maintain direct operational support to personnel involved with HCP operations at all levels of command. Service is provided via telephone consults, consultative letters, technical reports and installation site visits. Technical expertise is provided regarding all aspects of hearing conservation including the medical, social, and non-auditory effects of exposure to hazardous noise, and the disposition of patients.

PEGASUS BULLETIN BOARD
AL/OEMO (TSGT OLEG VORONIN)
DSN 240-2063/4
E-mail: OEMO@OEHL.BROOKS.AF.MIL

Objective: The PEGASUS electronic bulletin board has grown rapidly from a simple software access system for Bioenvironmental Engineers in 1988 to a highly-sophisticated communication medium serving over 700 Air Force Aeromedical Services customers logging in over 1,500 calls each month. Eight consecutive users can access this system twenty-four hours a day, seven days a week through four toll-free, three DSN or one internet connection. PEGASUS offers sixteen special interest conferences maintained by six subject matter experts in the field and one full-time system operator. Not only does the bulletin board provide a forum for fielding questions, experiences and comments, it also serves as an electronic repository for reference materials, including Air Force Operating Instructions, lesson plans, medical intelligence, and Aeromedical-specific software programs written by field customers.

Access to Services: Connection to PEGASUS requires a modem and simple telecommunications software. A user's manual is available, AL-TR-1993-0067, *PEGASUS, Electronic Bulletin Board System User's Guide*. PEGASUS may be accessed in the following ways at the customer's convenience:

DSN: 240-3784
Toll-free: 1-800-582-0365
TELNET: pegasus.brooks.af.mil

ENVIRONMENTAL SCIENCES CONSULTATION
AL/OEMH (MAJOR BARBARA LARCOM)
DSN 240-2063
E-mail: LARCOM@OEHL.BROOKS.AF.MIL

Background: The diverse background and training of the individuals who make up the Environmental Sciences Branch allow us to offer many consultative support activities to the base. Although much of our focus in the past has tended toward interactions with the Agency for Toxic Substances and Disease Registry (ATSDR), we are much more than a support service to bases on the EPA's National Priority List (NPL).

AL/OE Services Provided: We can support human health and environmental exposure analysis requests along with limited environmental sampling. We can help Air Force installations with all areas of toxicology including: interpretation of hazards presented by specific chemicals; review of sampling plans; human health risk assessments; and health risk communication support for public forums. We also publish a periodic newsletter, *Public Health Assessment News*, to collect and share useful information about public health assessment and environmental issues.

We provide these services by way of five programs (see descriptions on the following pages): **Health Assessment Assistance**, **Health Consultation/Rapid Response**, **Health Standards**, **Risk Communication**, and **Toxicology**. We provide assistance by telephone, e-mail, FAX (DSN 240-2315), or on-site. To request on-site assistance, send a letter of request to AL/OEMH, 2402 E Drive, Brooks AFB, TX 78235-5114. Please call us and FAX a copy of the request so we can schedule accordingly.

HEALTH ASSESSMENT ASSISTANCE
AL/OEMH (MR DON HAMMER)
DSN 240-2063
E-mail: HAMMER@OEHL.BROOKS.AF.MIL

Background: The Health Assessment Assistance Function is the designated technical focal point between the Air Force and the Agency for Toxic Substances and Disease Registry (ATSDR). Originally established to provide advice to bases on the National Priorities List (NPL), we have grown into the Air Force's central player providing not only advice on the ATSDR Public Health Assessment (PHA) process, but also site support to all bases in preparation for future PHAs. This support comes in the form of designated personnel within the branch to "shepherd" the base though every step of their PHA.

AL/OE Services Provided: We provide support to MAJCOMs and bases for evaluating public health impact of the Installation Restoration Program (IRP) efforts. The services provided include:

1. An on-site evaluation of the base's IRP sites and its current programs in light of lessons learned and experiences from the Air Force, Navy and Army.

2. When ATSDR visits the base during the PHA, we coordinate and accompany ATSDR representatives on base.

3. If at anytime the base has questions or issues during the PHA process, our specialists are ready to assist through telephone consults, written recommendations, public meeting support, and our access to ATSDR for clarification and interpretation of its policies.

4. We provide Air Combat Command (ACC) and the Air Force Base Closure Agency (AFBCA) with Data Gap and Sampling Analysis Plans (DGSAPs). The DGSAP incorporates the experience of our specialists with lessons learned from supporting the ATSDR program. By looking at bases from a public health view, the DGSAP summarizes the most probable areas requiring further consideration and sampling to adequately accomplish a complete Public Health Assessment.

HEALTH CONSULTATION/RAPID RESPONSE
AL/OEMH (MR JODY WIREMAN)
DSN 240-2063
E-mail: WIREMAN@OEHL.BROOKS.AF.MIL

Background: A health consultation provides advice on a specific public health issue related to real or possible human exposure to toxic chemicals or physical hazards. Depending on the question asked, nature and extent of the contamination, and amount of information available about the site, a team of specialists is able to mobilize and evaluate the situation. Whether it means sending out toxicologists to a base to address the public's concerns during a public session, or environmental scientists to view the site and collect samples, or a physician to address medical issues, we are tasked to respond as rapidly as the situation requires.

AL/OE Services Provided: The request for a health consultation can come from the base or MAJCOM.

1. We respond quickly to health concerns by researching the information pertaining to the toxic chemicals and reviewing available data. A response to whether a public health concern exists and, if necessary, recommendations for necessary actions to discern or alleviate the concern are provided. Examples of health consults include: evaluation of the toxic effects of chemicals, evaluation of data from areas that may be contaminated (especially important for BRAC sites that are being released), a determination about whether nearby residents are or may be threatened from base contamination, and answering public health concerns by evaluating current data or proposing future sampling to obtain necessary data.

2. We assist bases in planning sampling efforts and have the capability to perform field surveys. Every health consultation includes conclusions about public health hazards and recommendations for necessary actions to discern or alleviate the concern. Our recommendations contribute to site cleanup, ensure base and community residents safe drinking water, and improve community relations by showing Air Force concern for their well-being.

HEALTH STANDARDS
AL/OEMH (CAPT WADE WEISMAN)
DSN 240-2063
E-mail: WEISMAN@OEHL.BROOKS.AF.MIL

Background: The Health Standards Function was organized to provide health risk-based technical support to the Air Force Installation Restoration Program (IRP) community. The Air Force recognizes the dilemma that many of the standards and criteria used to drive remediation at IRP sites are not directly related to the human health risk posed by the compound. To solve this dilemma, we identify individual chemicals or classes of compounds of greatest interest to the AF based on the extent of contamination and the toxicity of the compound. Once identified, preliminary remediation goals can be calculated based on the best available science. For many compounds, there may be significant technical data or information gaps that can only be filled through a well-defined research program. This process is completed as a joint effort between this function and the Armstrong Laboratory Toxicology Division (AL/OET).

AL/OE Services Provided:

1. We facilitate the transfer of information on compound evaluations to IRP project managers. We offer concise translation of technical data and help them build effective strategies for negotiation of clean-up levels at their sites.

2. We provide on-site toxicological and health standards consultative support to assist with site negotiations for records of decisions, risk management decisions, and remediation selection.

RISK COMMUNICATION
AL/OEMH (MAJOR YONA HACKL)
DSN 240-2063
E-mail: HACKL@OEHL.BROOKS.AF.MIL

Background: Health professionals, Installation Commanders, Public Affairs Officers, Environmental Management personnel, and scientists often are required to provide information to the public about real or perceived risk to the public health and the environment. Air Force personnel have little experience dealing with risk communication principles and they often fail to *effectively* communicate to the public the environmental risk. The Risk Communication Function is developing the capability to assist bases with conveying to the public, media, or other health care professionals health risks associated with their base's environmental hazards.

AL/OE Services Provided: In coordination with the School of Aerospace Medicine, we train medical, civil engineering, and public affairs personnel in basic risk communication principles and practices. We develop instructional materials and collect reference materials for use in developing approaches to conveying the risk, and management of that risk, at public meetings or with use of other media.

TOXICOLOGY CONSULTATION
AL/OEMH (MR JOHN HINZ)
DSN 240-2063
E-mail: HINZ@OEHL.BROOKS.AF.MIL

Objective: A team of toxicologists - with expertise in general, inhalation, developmental, ecological toxicology and risk assessment, as well as the biological and medical sciences - provide consultative support in chemical analysis, environmental and earth science, and public health.

AL/OE Services Provided:

1. We routinely address a number of questions and issues that are phoned or faxed in each week. Our toxicologists are available to all bases and MAJCOMs for assistance with interpreting technical issues relating to exposure of hazardous materials.

2. We teach or provide other instructional support for various training programs.

3. Our toxicologists review and evaluate ATSDR technical documents and toxicological profiles on compounds of interest to the Air Force, offering suggestions and input as professional colleagues.

4. We provide a concise translation of the technical data on toxicology, health and risk into clear, understandable language for Air Force personnel and the general public. Response time will range from one day to two weeks.

5. We administer time and materials contracts for any type of toxicology need, including exposure assessments, technical review of current literature, and ecological risk assessments. See **Occupational Medicine Division Services, LEVEL 5** for information on contract support.

INDUSTRIAL HYGIENE CONSULTATION
AL/OEMI (LTC CRAIG HOLLENBECK)
DSN 240-3214
E-mail: OEMI@OEHL.BROOKS.AF.MIL

Background: The Industrial Hygiene Branch manages programs on **Asbestos**, **Indoor Air Quality**, **Lead-Based Paint**, and **Noise and Vibration Hazards** (see specific descriptions on the following pages). In addition to the above subjects, we have experience in virtually any other industrial hygiene topic relevant to an Air Force BEE, and can provide in-depth technical guidance. Typical topics include:

AFTOX (Mapping of Toxic Corridor)
Confined Spaces
Engineering Controls
Evaluations of IH Equipment
HAZCOM
HAZMAT (Chemical) Response
Industrial Ventilation
Personal Protective Equipment (PPE)
Pesticides
Respiratory Protection
Sampling Methods for IH
Thermal Stress

Access to Services: If you cannot find an answer after making a reasonable attempt to resolve the problem at the local level, or you'd just like to discuss your approach with someone else, call us at DSN 240-3214 and ask for the IH Technician in the Barrel. This individual will attempt to respond immediately based on his experience and the information resources we have in our office. If necessary, the technician or an engineer will study the issue and call back later with more information.

By the way, our experience indicates that our consultation services are more effective if you have first consulted with your NCOIC or OIC, and reviewed applicable Armstrong Laboratory Technical Reports or information published in this Laboratory Services Guide.

NOTE: If resolution of the issue requires a policy interpretation, it will be necessary to contact your MAJCOM BEE.

ASBESTOS PROGRAM

AL/OEMI (CAPT ALEX GHATTAS)
DSN 240-3214
E-mail: GHATTAS@OEHL.BROOKS.AF.MIL

Applicable Regulations & Publications:

40 CFR 61, Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP)
40 CFR 763, Asbestos Hazard Emergency Response Act (AHERA)
29 CFR 1910.1001, Asbestos; General Industry
29 CFR 1926.1101, Asbestos
AFI 32-1052, Facility Asbestos Management
USEPA, Guidance for Controlling Asbestos-Containing Materials (ACM) in Buildings, EPA 560/5-85-024
USEPA, Managing Asbestos in Place, EPA 2OT-2003
USEPA, Measuring Airborne Asbestos Following an Abatement Action, EPA 600/4-85-049
USEPA, Asbestos in Buildings: Simplified Sampling Scheme for Surfacing Materials, EPA 560/5-85-030A
Asbestos School Hazard Abatement Reauthorization Act (ASHARA)
Applicable State and Local Regulations
AFOSH Std 48-4, Controlling Exposures to Hazardous Materials

BEE Responsibilities: In addition to the responsibilities listed in AFOSH Std 48-8, Controlling Exposure to Hazardous Materials, the BES will:

1. Ensure asbestos analyses are performed by NVLAP accredited laboratories.

2. Ensure personnel performing asbestos work, including sampling, receive proper EPA accredited training.

3. Provide assistance to Civil Engineering/Environmental Management in prioritizing asbestos abatement projects.

4. Review CE construction/renovation plans for ACM.

5. Determine if small-scale short duration operation exclusions apply.

6. Ensure air sampling analysis is consistent with the OSHA Reference Method (ORM).

7. Ensure clearance level is achieved before reoccupancy following asbestos abatement projects.

8. Ensure respirator fit testing is performed at the time of initial fitting and at least every six months thereafter.

9. Ensure qualitative fit testing is performed only for testing the fit of half-mask respirators when they are permitted to be worn.

AL/OE Services Provided:

1. Analysis. Our analytical laboratory (AL/OEA) can provide a routine five day turnaround on air and bulk asbestos sample analysis. OEA can also provide 24-hour turnaround on justified priority samples. For priority requests or a large number of samples (>50) call Mr. Andy Richardson or Ms. Doris Tessmer in advance (DSN 240-3626). See **Sampling for Asbestos** and the Asbestos entry in the **Industrial Hygiene Sampling Parameter Table** for collection procedures.

2. Consultation. Our industrial hygiene consultants (AL/OEMI) can provide a technical evaluation of sampling and abatement methods, perform risk assessments and building surveys, review and comment on regulation and policy, and do emergency consultation. Contact Capt Ghattas at DSN 240-3214.

3. Contract Services. We have a mechanism to provide contract services for asbestos inspections, surveys, and risk assessment. See **Occupational Medicine Division Services, Level 5** for details.

INDOOR AIR QUALITY PROGRAM

AL/OEM (MAJOR JON O'NEAL)
AL/OEMI (CAPT KEVIN BOYLE)
DSN 240-3214
E-mail: ONEAL@OEHL.BROOKS.AF.MIL
E-mail: BOYLE@OEHL.BROOKS.AF.MIL

Background: The Occupational Medicine Division has managed a program on Indoor Air Quality (IAQ) since 1985. Our objectives are to reduce illness and absenteeism among Air Force office workers, and to remove environmental hindrances to their productivity. We do this by educating base-level Preventive Medicine personnel about what they can do to resolve IAQ problems, and by identifying preventable factors that frequently result in unacceptable IAQ. Our definition of IAQ does not include **asbestos**, **lead-based paint**, or **radon**, as these are managed under separate programs.

Currently, there are no federal or Air Force regulations governing IAQ, other than AFR 30-27, Smoking in Air Force Facilities, and a recent Department of Defense directive to eliminate smoking in all workplaces. On April 5, 1994, the Occupational Safety and Health Administration announced a Notice of Proposed Rule-making on Indoor Air Quality, but it will take some time (probably two years or longer) before a final rule is published. Some state and local governments have begun to regulate air quality in the workplace.

AL-TR-1992-0016, Guide for Indoor Air Quality Surveys, provides background information and an investigation protocol that can be used to successfully resolve many complaints at base level. For the best chance of success, it is essential that the MPH and BEE offices work as a team and foster a cooperative relationship with building managers and civil engineering operations and maintenance personnel.

MPH responsibilities: We recommend that the MPH office perform epidemiological tasks, to include distribution and compilation of questionnaires, and the interview of workers or coordination of interviews by physicians. **Appendix D, AL-TR-1992-0016** describes these duties in more detail, and **Appendix B, AL-TR-1992-0016** has a sample questionnaire.

BEE responsibilities: We recommend that the BEE office inspect the heating, ventilating, and air-conditioning (HVAC) system with civil engineering personnel, and perform air sampling as needed. **Appendix D, AL-TR-1992-0016** lists HVAC system items to evaluate, and discusses how and where to collect and interpret temperature, relative humidity and carbon dioxide concentrations. Other potential candidates for air sampling include:

1) Chemical Contaminants: See **Sampling for Indoor Air Quality** notes associated with the **Industrial Hygiene Sample Parameters Table** for a discussion on the collection and interpretation of formaldehyde and total hydrocarbon samples.

2) Bioaerosols: **Appendix C, AL-TR-1992-0016** provides a protocol for bioaerosol sampling and describes interpretation. See the **Environmental Microbiology Support** program description for analytical support available.

LEAD-BASED PAINT (LBP) PROGRAM
AL/OEMI (CAPT TIMOTHY J. MUKODA)
DSN 240-3214
E-mail: MUKODA@OEHL.BROOKS.AF.MIL

Applicable Regulations:

HQ USAF/CC Letter, 24 May 1993, Policy and Guidance on Lead-Based Paint in Facilities
29 CFR 1926.62, Occupational Safety and Health Standards for the Construction Industry, "Lead"
Title 24, USC, Section 4822, as amended, Lead-Based Paint Poisoning Prevention Act (LBPPPA) of 1971
16 CFR 1303, Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint, implementing the Consumer Safety Act of 1977
24 CFR 35, Lead-Based Paint Poisoning Prevention Act in Certain Residential Structures
Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, U.S. Dept of Housing and Urban Development (HUD), Dec 1993 (Draft)
29 cfr 1910.1025, lEAD sTAN

MPH Responsibilities: The MPH is required by the 24 May 93 HQ USAF/CC policy letter to manage a blood lead screening program for children 7 years old and under. An equally vital task is to educate the base population on the occupational and environmental hazards associated with exposure to lead. Guidance on completing responsibilities can be found in **AL/OE-TR-1993-0175**, Lead Exposure Hazard Management Guide. OSHA's Lead in Construction standard, 29 CFR 1926.62, requires medical monitoring for many types of construction tasks associated with lead-based paint, to include both industrial facilities and housing units. Cooperation with the BEE and CE in identifying maintenance activities involving LBP is essential.

BEE Responsibilities: BEE duties associated with LBP occur in both the environmental and occupational arenas.

1. Environmental. The 24 May 93 HQ USAF/CC policy letter tasks the BEE with assisting Civil Engineering in the identification, inspection, and survey of family housing units and listed high priority facilities suspected of containing LBP. In addition, risk assessments and/or abatement action may be required in some situations. The BEE may be required to perform x-ray fluorescence (XRF) testing, chip sampling, dust sampling, soil sampling, or any combination thereof to ensure these requirements are met. The BEE will serve in a consultant role advising CE of appropriate actions in situations where LBP is deteriorating; or of in-place management techniques when LBP poses no immediate threat to health. Guidance on completing responsibilities can be found in **AL/OE-TR-1993-0175**, Lead Exposure Hazard Management Guide.

2. Occupational. The BEE must evaluate airborne lead exposures and ensure compliance with industrial tasks as specified in 29 CFR 1910.1025 and construction tasks as specified in 29 CFR 1926.62. The new Lead in Construction standard which took effect in August 1993 has caused significant increases in the amount of exposure monitoring required at many bases.

AL/OE Services Provided:

1. For MPH questions involving occupational lead exposures, contact Capt Cogburn, AL/OEMO, DSN 240-2063. For questions involving the childhood blood lead screening program, please contact Major Eggert or Capt Robins, Epidemiology Services (AL/AOES), DSN 240-3471.

2. We have a great deal of experience in developing contract services for LBP inspections, surveys, risk assessments, and waste disposal activities. See the discussion under **Occupational Medicine Division Services, Level 5** for details.

3. We have a Lead Toxicity Investigation team that can respond to situations that go beyond the expertise of the BEE and MPH, such as when a possible childhood lead poisoning case becomes a media event. Give us a call and we can advise you on your options for this or any other issue related to lead.

NOISE AND VIBRATION HAZARD ASSESSMENT
AL/OEMI (CAPT KEITH GROTH)
DSN 240-2455/3214
E-mail: NOISE@OEHL.BROOKS.AF.MIL

Applicable Regulations:
AFOSH Standard 48-19, Hazardous Noise Program
AFOSH Standard 161-20, Hearing Conservation Program
AFI 37-7062, Air Force Comprehensive Planning
AFI 32-7063, Air Installation Compatible Use Zone
29 CFR 1910.95, Occupational Noise Exposure
AFR 161-15, Audiometric Test Booths for Medical Facilities
T.O. 00-25-237, Procedures for Identifying and Justifying Base Requirements for Aircraft Turbine Engine Ground Run-Up Noise Suppressors

BEE Responsibilities: The responsibilities for Bioenvironmental Engineering Services are clearly defined in AFOSH Standard 48-19, paragraph 1.6. Overall, the BEEs are responsible for performing noise surveillance to determine if workers who are potentially exposed to hazardous noise require engineering controls, administrative controls, or personal protection, or if potential hazardous noise areas require posting. They should also review facility and operations plans for both new and existing facilities to ensure noise exposure control is adequately considered, determine the type of personal hearing protection devices required, perform noise surveys or assessments of new operations before they are started, and recommend to the Aerospace Medicine Council workplaces where workers should receive periodic audiometric monitoring.

Presently, there is a new requirement for the BEEs to perform annual background noise level surveys inside audiometric testing booths to ensure compliance with AFR 161-15. It should be noted, the octave band levels listed in AFR 161-15, Table 1 "Allowable Background Noise Levels for Hearing Conservation Audiometric Rooms Door Closed (Inside Measurement)" have been superseded by AFOSH Standard 161-20. The required octave band levels are listed in paragraph 4-2c(4)(b) of AFOSH Standard 161-20 even though AFOSH Standard 48-19 references AFR 161-15. Note: Some sound level meters (e.g. Genrad 1982 or 1988) do not measure sound levels in the ranges necessary to perform these surveys. Meters suitable for Audiometric Testing Booth Surveys are avalable for loan through AL/OEMI's Equipment Loan section. (DSN: 240-2142)

AL/OE Services Provided (see also **Hearing Conservation Data Registry**):

a. Surveys: Generally, we perform surveys on noise and vibration problems when beyond the scope of the BEE. We can perform specialized surveys for vibration induced noise, sound intensity, reverberation, verification of hush house and noise suppressor performance, human exposure to vibration, and aircraft noise.

b. Computer software: We have written several computer programs to aid the BEEs in downloading and analyzing noise data. Documentation for the programs can be found in either a computer readme document or hard copy technical report. Some of the programs are furnished with sample data files so personnel can practice using the program before they collect any data. All computer programs, data files, and readme documents are available on **PEGASUS** in the BES conference, or can be obtained by contacting the Noise Hazards Function. On the next page, a table lists the program's computer file name, type of documentation and data files available, and a brief description of the purpose.

Program Title	Documentation	Data Files (Yes/No)	Purpose of Program
DB310AVG.BAS	Readme Document	Yes	Average Metrosonics db-310 dosimeter data files
M3100AVG.BAS	Readme Document	Yes	Average Metrosonics db-3100 dosimeter data files
DNL.BAS	Readme Document Technical Report (89-103EI0111JNA)	Yes	Calculate day night average noise levels from Metrosonics db-310 data files
${Z}	Readme Document Technical Report (89-103EI0111JNA)	No	Macro to transfer Metrosonics db-310 data files to computer
HPDA	Technical Report (AL-TR-1992-0132)	Yes	Perform Hearing Protection Device Assessment using Metrosonics db-3100 dosimeters

EQUIPMENT LOAN SECTION
AL/OEMI (SSgt TY KING)
DSN 240-2142
E-mail: LOANER@OEHL.BROOKS.AF.MIL

The Equipment Loan Section provides unique sampling and monitoring equipment that is not cost-effective for a base to purchase for themselves. In addition, we provide routine monitoring equipment as a temporary replacement when base instruments are out of service. Emergency sampling supplies are also available. Equipment is available for purposes of industrial hygiene, environmental quality, and radiation monitoring. The procedures for requesting equipment and a listing of equipment currently available can be found in **AL-TR-1993-0033**.

OCCUPATIONAL HEALTH CONSULTATION
AL/OEMO (MAJOR PHOEBE FISHER)
DSN 240-2063/4
E-mail: OEMO@OEHL.BROOKS.AF.MIL

Background: The Armstrong Laboratory Occupational Health Branch (AL/OEMO) provides consultative and technical information on occupational health topics to Air Force customers worldwide. Major program areas within the Branch include: **Ergonomics, Occupational/Environmental Epidemiology, and Hearing Conservation** (see specific descriptions on the following pages). In addition, OEMO maintains two major databases: the **Air Force Occupational Illness Data Registry**, which contains more than 4000 reports of work-related disorders, and the **Air Force Hearing Conservation Data Registry**, with over 4.5 million audiograms. The Branch is also the home of **PEGASUS**, a computerized Air Force bulletin board system for information exchange and networking among Aeromedical Services personnel. Topics commonly addressed by the OEMO consultant staff include:

Biological Monitoring
Medical Surveillance
Health Effects of Chemical Exposures
Occupational Illness Reporting
Occupational Illness Clusters
Cumulative Trauma Disorders
Tool/Workplace Design
Clinic Employee Health
Hearing Protection
AF HEARS
Fetal Protection
Reproductive Risks
Occupational Lead Exposures
Indoor Air Quality
Thermal Stress

Access to Services: A simple phone call, E-Mail, or Bulletin board inquiry initiates personalized service from our consultants; average turn-around time is less than 24 hours for most questions.

ERGONOMICS

AL/OEMO (MAJOR ED KLINENBERG)
DSN 240-2063/4
E-mail: OEMO@OEHL.BROOKS.AF.MIL

Objectives: Consultants provide a variety of on-site and consultative support services to both Major Command and base-level ergonomics program managers. Information on cumulative trauma disorders, vibration, office and industrial equipment, workplace modification and ergonomics program implementation can be obtained by telephone, E-mail, or bulletin board message.

Applicable References:

AFOEHL Report 90-043EH00542DXX, *Ergonomics and Radiation Effects from Video Display Terminals and Workstations*
AL-TR-1991-0082, *Ergonomics Manual*
AL-CL-1992-0114, *Ergonomic Assessment of Parachute Shop, Holloman AFB, MN*
AL-CL-1992-0149, *Ergonomic Assessment of Aircraft Directorate Area, Kelly AFB, TX*
AL-CL-1993-0113, *Ergonomics Site Support Visit, Eglin AFB, FL*
AL-CL-1994-0013, *Ergonomics Site Support Visit, Kelly AFB, TX*
AL-CL-1994-0038, *Ergonomics Site Support Visit, Wright-Patterson AFB, OH*

BEE/MPH Responsibilities: Currently OSHA is in the process of publishing a final rule on Ergonomics, and there is an AFOSH Std in coordination. Neither are likely to be completed until 1995. In the meantime, OSHA is citing violations under the general duty clause.

Bioenvironmental Engineers and/or Military Public Health Officers may be tasked with managing a base-level ergonomics program. Typical activities include: identifying and prioritizing ergonomic hazards in the workplace, implementing engineering or administrative controls to minimize or eliminate ergonomic hazards, and providing supervisor and worker ergonomics training.

OCCUPATIONAL/ENVIRONMENTAL EPIDEMIOLOGY
AL/OEMO (MAJOR KEVIN GRAYSON)
DSN 240-2063/4
E-mail: OEMO@OEHL.BROOKS.AF.MIL

Objective: The Occupational/Environmental Epidemiology section applies statistical and epidemiological techniques to evaluate Air Force health with respect to workplace and environmental exposures.

Occupational Illness Data Registry: In 1989, Occupational/Environmental Epidemiology personnel developed a database for storing all Air Force occupational illness information received from base-level Military Public Health officers on AF Forms 190, *Report of Occupational Illness/Injury*. The Occupational Illness Data Registry now contains over 4000 illness reports. As the forms are received, they are reviewed for accuracy and completion, then entered into the Registry database by an occupational health technician. Approximately 100 AF Forms 190 are received monthly from CONUS installations; summary statistics are extracted annually for Air Staff reporting to the Bureau of Labor. The section also analyzes the data and provides feedback on high-risk workplaces and trends to base-level customers.

MPH Responsibilities: MPH officers are responsible for submitting an AF Form 190 on any illness associated with, or exacerbated by workplace factors.

AL/OE Services Provided:

1. Staff members design and conduct population-based studies, investigate occupational cancer clusters, and provide consultative epidemiological services to Air Staff and base-level customers alike. In addition, we perform recurring and special request analyses on OEMO's occupational illness data for trends and/or associations.

2. Questions on AF Form 190 reporting can be directed to any OEMO staff member.

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE CONSULTATION
AL/OEM (LT COL WILLIAM GOULD, MAJOR JON O'NEAL)
DSN 240-3214
E-mail: lastname@OEHL.BROOKS.AF.MIL

Background: The Armstrong Laboratory Occupational Medicine Division (AL/OEM) has two occupational medicine physicians on staff. We can provide general Occupational and Environmental Medicine consultation on a variety of subject areas, including industrial hygiene, military public health, and environmental sciences. Topics we commonly address include:

Indoor Air Quality
Lead-Based Paint
Toxic gas distribution modeling
Solvent and Chemical exposure
Heavy metal exposure
Pesticide exposure
Clinic/hospital employee health
Bloodborne Pathogens
Occupational illness evaluation
Program and study design evaluation
Ergonomics
Reproductive Risks

Access to Services: A phone call or letter initiates personalized consultative service.

Det 3 AL

INTRODUCTION

AL/OE Brooks AFB TX 78235, provides complete consulting, engineering and analytical support services worldwide. Det 3 AL provides limited services to activities within the Pacific theater of operations.

The mission of Det 3 AL is to provide bioenvironmental engineering, analytical chemistry and environmental entomology consultant services to USAF and other U.S. Governmental Agencies in the Pacific theater of operations.

To fulfill our mission, Det 3 AL provides the following services: medical entomology, environmental protection, occupational safety and health consultations, field surveys, equipment loan, limited sample analysis and radiological protection surveys.

ANALYTICAL SERVICES: On the next page is a listing of Det 3 AL/AD industrial hygiene and environmental analytical capabilities.

CONSULTANT SERVICES are similar to those available at AL/OEM and AL/OEB. Please call and speak to a consultant to find out if we can meet your particular need in house. If we cannot, we can assist in obtaining services from AL/OEM or AL/OEB.

Phone Numbers:

Commander, Director of Operations, Environmental Biology, Entomology:
DSN: (315) 634-1769 (with answering machine) or (315) 634-3505
DSN FAX: (315) 634-1429
Environmental Quality, Health Physics, Industrial Hygiene:
DSN: (315) 634-2648/2639/2636
DSN FAX: (315) 634-2611

E-mail: last name, first initial of person @emh.kadena.af.mil

Written requests for consultative services should go through HQ PACAF/SGPB with a courtesy copy to DET 3 AL/DO, Unit 5213, APO AP 96368-5213, so we can plan to support your request.

DET 3 AL/AD
INDUSTRIAL HYGIENE & ENVIRONMENTAL ANALYTICAL CAPABILITIES

Det 3 AL uses the same collection methodology and medias as AL/OE. The analytical procedures are also very similar. However, due to our location, size and manning limitations, we can only provide limited analytical services.

Please call if you are not sure if we can run your particular sample or if you are sending a large number of samples. For priority analysis you MUST call and coordinate in advance. If you need assistance with impinger reagents, call and we will try to assist. Samples we cannot run in-house will be trans-shipped to AL/OEA at Brooks AFB, increasing your waiting time.

For Environmental Samples:

Waters — Groups A, D, E, F, G

For Industrial Hygiene Samples:

Asbestos (bulk and air)
Most Charcoal tubes*
MEK on ambersorb tubes
Metals (filters, oil, soil)
Charcoal Passive dosimeters
Chromates (on PVC filters)
PCB's in oil, swipe or soil
Mercury
Phenol in urine and air
Ammonia (call lab for media)
Lead content in paint/paint chips/ceramics
Fluorides (call lab for media)

*For PD 680, jet fuels and naphtha, please send 2-5 mL for use as a calibration standard since each batch differs significantly. Separate the charcoal tubes from the liquid by placing them in separate zip lock bags.

DSN: (315) 634-2265 (laboratory) or (315) 634-1347 (office)
DSN FAX: (315) 634-1429

COMMERCIAL: (81) 6117-34-2265/1347
COMMERCIAL FAX: (81) 6117-34-1429

Mailing Address:
DET 3 AL/AD
UNIT 5213
APO AP 96368-5213

E-mail: last name, first initial of person @emh.kadena.af.mil

Environmental Chemistry

Table of Contents

Environmental Section
Explanation of Tables

This portion of the services guide is divided into two basic sections:

I. Alpha Table - lists each individual chemical with its chemical abstract number and the appropriate methods depending on which Federal Regulation you are working with:

Safe Drinking Water Act - SDWA
Clean Water Act - CWA/NPDES/SPDES - waste water/storm water
Resource Conservation and Recovery Act - RCRA - Hazardous Waste

II. The next section is specific to the particular regulation and are listed by EPA method number.

SWDA-	1) Collection, Preservation, Holding Time
	2) Method Detection Limits, Maximum Contaminant Levels
NPDES-	1) Collection, Preservation, Holding Time
	2) Method Detection Limits, Maximum Contaminant Levels
RCRA-	1) Collection, Preservation, Holding Time
	2) Method Detection Limits

Note: Only Federal MCL's are listed. Your state or water district may have set lower MCL's for some chemicals. Write in your state specific requirements and MDL's for future reference.

Text/Recommendations - This subsection has descriptions and recommendations specific to certain types of samples (i.e., pesticides, volatiles). This subsection includes items such as sources for sample containers, hints on how to collect the sample, etc.

These sections and subsections have been tabbed (in hard copy) to make it easier to flip from one section to another. There is also a section on collection of radionuclides which are analyzed by AL/OEBA. We have included a quick reference subsection which contains 1-2 page tables that can be removed and/or used for a quick overview of sampling or Federal Regulatory Limits. There is also a separate subsection on hazardous waste which gives detailed instructions on how to collect, what analyses to request, TCLP information and quality control. A section is included on sampling for water quality.

If you have questions or comments, please contact the lab. If your questions are about sample results (copies, etc.), please ask for our new customer service section. This group of individuals is seated at our main computer and right outside our file room to better assist you.

Environmental Chemistry Alphabetical Table

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
1912249	Aatrex	See Atrazine		
510156	Acaraben	See Chlorbenzilate		
83329	Acenaphthene	550.1	610/625	8270A/8100
208968	Acenaphthylene	550.1/525.1	610/625	8270A/8100
75070	Acetaldehyde	554		8315
67641	Acetone			8260
75058	Acetonitrile			8260
98862	Acetophenone			8270A
591082	1-Acetyl-2-thiourea			8270A
53963	2- Acetylaminofluorene			8270A
ACIDT	Acidity (TOTAL)	305.1	305.1	
62476599	Acifluorfen	515.1/555		8151
107028	Acrolein		603/624	8260/8316
79061	Acrylamide			8032/8316
107131	Acrylonitrile		603/624	8031/8260/8316
327980	Agritox	See Trichloronate		
15972608	Alachlor	507/525.1	102	
116063	Aldicarb	531.1		8318
1646884	Aldicarb sulfone	531.1/525		8318
1646873	Aldicarb sulfoxide	531.1		
309002	Aldrin	505/508/525.1	608/617/625	8080B/8081/8270A
ALKB	Alkalinity, Bicarbonate	310.1	310.1	

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
ALKH	Alkalinity, Hydroxide	(Calculated from total and Phenolphthalein)		
ALKT	Alkalinity, total	310.1	310.1	
107186	Allyl alcohol			8260
107028	Allyl aldehyde	See Acrolein		
107051	Allyl chloride			8260
40596698	Altosid	See Methoprene		
7429905	Aluminum	202.1/202.2/200.7/200.9	202.1/202.2/200.7 / 200.9	6010A
52645531	Ambush	See Pemethrin		
834128	Ametryn	507	619	
133904	Amiben	See Chloramben		
117793	2-Aminoanthraquinone			8270A
60093	Aminoazobenzene	See p-Aminoazobenzene		
60093	p-Aminoazobenzene			8270A
92671	4-Aminobiphenyl			8270A
2032599	Aminocarb		632	
7664417	Ammonia (nitrogen)	350.1	350.1	
3566107	Amobam		630/630.1	
101053	Anilazine			8270A
62533	Aniline			8270A
90040	o-Anisidine			8270A
120127	Anthracene	550.1/525.1	610/625	8270A/8100
74400360	Antimony	204.2/200.9	204.2/200.9	6010A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
37333407	AOP		630	
140578	Aramite			8270A
137268	Arasan	See Thiram		
12674112	Aroclor 1016	505/508	608/617/625	8080B/8081/8270A
12674112	Aroclor 1016 in Oil			600/4-81-045
11104282	Aroclor 1221	505/508	608/617/625	8080B/8081/8270A
11104282	Aroclor 1221 in Oil			600/4-81-045
11141165	Aroclor 1232	505/508	608/617/625	8080B/8081/8270A
11141165	Aroclor 1232 in Oil			600/4-81-045
53469219	Aroclor 1242	505/508	608/617/625	8080B/8081/8270A
53469219	Aroclor 1242 in Oil			600/4-81-045
12672296	Aroclor 1248	505/508	608/617/625	8080B/8081/8270A
12672296	Aroclor 1248 in Oil			600/4-81-045
11097691	Aroclor 1254	505/508	608/617/625	8080B/8081/8270A
11097691	Aroclor 1254 in Oil			600/4-81-045
11096825	Aroclor 1260	505/508	608/617/625	8080B/8081/8270A
11096825	Aroclor 1260 in Oil			600/4-81-045
7440382	Arsenic	206.2/200.9	206.2/200.9	6010A
1332214	Asbestos	600/4-83-043		
3244904	Aspon		622.1	
52857	Asulam			8321
52857	Asulox	See Asulam		
1610179	Atraton	507	619	

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
1912249	Atrazine	507/525.1	619/122/409	
FCHR	Avgas	MOD EPA 8015, GC/MS In house method	MOD EPA 8015, GC/MS In house method	
86500	Azinphosmethyl		622,614	8140/8141A/8270A
6923224	Azodrin	See Monocrotophos		
1918009	Banvel	See Dicamba		
101279	Barban		632	8270A
86500	Barben	See Azinophos methyl		
7440393	Barium	208.1/208.2/200.7	208.1/208.2/200.7	6010A
25057890	Basagran	See Bentazon		
55389	Baycid	See Fenthion		
114261	Baygon	531.1	632	8318
55389	Baytex	See Fenthion		
22781233	Bendiocarb		639	
17804352	Benlate	See Benomyl		
17804352	Benomyl		631	
741582	Bensulide		636	
25057890	Bentazon	515.1/555		8151
98873	Benzal Chloride			8121
71432	Benzene	502.2/503.1/524.2	602/624	8020/8021/8260
108985	Benzenethiol	See Thiophenol		
92875	Benzidine	553	605/625	8270A
98077	Benzo trichloride			8121

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
56553	Benzo-(a)anthracene	550.1/525.1	610/625	8270A/8100/8410
50328	Benzo-(a)pyrene	550.1/525.1	610/625	8270A/8100
205992	Benzo-(b)fluoranthene	550.1/525.1	610/625	8270A/8100
191242	Benzo-(g,h,i)perylene	550.1/525.1	610/625	8270A/8100
207089	Benzo-(k)fluoranthene	550.1/525.1	610/625	8270A/8100
65850	Benzoic acid			8270A
106514	p-Benzoquinone			8270A
33878501	Benzoylpropethyl	553		
100516	Benzyl alcohol			8270A
85687	Benzylbutylphthalate	See Butyl benzyl phthalate		
100447	Benzyl chloride			8121/8260
98873	Benzyl dichloride	See Benzal chloride		
7440417	Beryllium	210.1/210.2/200.7/200.9	210.1/210.2/200.7 / 200.9	6010A
319846	α-BHC	508	608/617	8080B/8081/8121/ 8270A
319857	β-BHC	508	608/617/625	8080B/8081/8121/ 8270A
58899	γ-BHC	505/508/525.1	608/617	8080B/8081/8121/ 8270A
319868	Δ-BHC	508	608/617/625	8080B/8081/8121/ 8270A
111911	Bis(2-chloroethoxy) methane		625/611	8270A/8110
111444	Bis(2-chloroethyl) ether		625/611	8270A/8110
108601	Bis(2-chloroiso-propyl) ether		625/611	8270A/8110
605549	Bis(2-ethoxyethyl) phthalate (BEEP)			8061
103231	Bis(2-ethylhexyl) adipate	525.1/506		
117817	Bis(2-ethylhexyl) phthalate (DEHP)	525.1/506	606/625	8270A/8060/8061

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
117828	Bis(2-methoxyethyl) phthalate (BMEP)			8061
117839	Bis(2-n-butoxyethyl) phthalate (BBEP)			8061
146509	Bis(4-methyl-2-pentyl) phthalate (BMPP)			8061
3689245	Bladafum	See Sulfotepp		
21725462	Bladex	See Cyanazine		
62476599	Blazer	See Acifluorfen		
BOD	BOD (Bichemical Oxygen Demand)	405.1	405.1	
28249776	Bolero	See Thiobencarb		
35400432	Bolstar		622	8140/8141A
7440428	Boron	200.7	200.7	6010A
99309	Botran	See Dichloran		
57578	BPL	See β-Propiolacetone		
1897456	Bravo	See Chlorothalonil		
314409	Bromacil	507	109	
2495967	Bromide		300.0	
598312	Bromoacetone			8260
108861	Bromobenzene	502.2/524.2/502.1/503.1		8010/8021/8260
5589963	Bromochloroacetic acid	552		
83463621	Bromochloroacetonitrile	555		
74975	Bromochloromethane	502.2/524.2/502.1		8010/8021/8260
75274	Bromodichloromethane	502.2/501.1/510.1/502.1/ 551/524.2	601,624	8010/8021/8260
101553	4-Bromodiphenyl ether	See 4-Bromophenyl phenyl ether		
75252	Bromoform	502.2/501.1/510.1/502.1/ 551/524.2	601,624	8010/8021/8260

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
74839	Bromomethane	502.2/502.1/524.2	601,624	8010/8021/8260
101553	4-Bromophenyl phenyl ether		625/611	8270A/8110
101553	p-Bromophenyl phenyl ether	See 4-Bromophenyl phenyl ether		
1689845	Bromoxynil			8270A
51026289	Busan 40		630/630.1	
1208030	Busan 85		630/630.1	
23184669	Butachlor	507	102	
123728	Butanal	554		8315
4170303	2-Butanal	See Crotonaldehyde		
104518	2-Butanone			8260
94826	Butoxone	See 2,4-DB		
85687	Butyl benzyl phthalate	525.1/506	625/606	8270A/8060/8061
2008415	Butylate	507	634	
104518	n-Butylbenzene	502.2/503.1/524.2		8021/8260
135988	sec-Butylbenzene	502.2/503.1/524.2		8021/8260
98066	tert-Butylbenzene	524.2/502.2/503.1		8021/8260
123728	Butyraldehyde	See Butanal		
7440439	Cadmium	213.1/213.2/200.7/200.9	213.1/213.2/200.7 / 200.9	6010A
58082	Caffeine	553		8321
7440702	Calcium	215.1/200.7	215.1/200.7	6010A
8001352	Camphechlor	See Toxaphene		
7287196	Caparol	See Prometryn		
2425061	Captafol			8270A

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
133062	Captan		617	8270A
14484641	Carbamate	See Ferbam		
2631370	Carbamult	See Promecarb		
63252	Carbaryl	531.1/553	632	8270A/8318
10605217	Carbendazim		402	
1563662	Carbofuran	531.1	632	8270A/8318
108952	Carbolic acid	See Phenol		
75150	Carbon bisulfide	See Carbon disulfide		
124389	Carbon dioxide (Calculated)		406A	
75150	Carbon disulfide			8260
56235	Carbon Tetrachloride	502.2/502.1/524.2/551	601/624	8010/8021/8260
786196	Carbophenothion		617	8270A
5234685	Carboxin	507		
101279	Carbyne	See Barban		
3566107	Chem-O-Ban	See Amobam		
COD	Chemical oxygen demand (COD)		410.4	
75876	Chloralhydrate	551		
133904	Chloramben	515.1/555		8151
57749	Chlordane	505/508	608/617/625	8080B/8081/8270A
5103719	α-Chlordane	525.1		
5103742	γ-Chlordane	525.1		
470906	Chlorfenvinphos			8270A
168870	Chloride	325.2	325.2	

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
7782505	Chlorine	330	330	
8001352	Chlorinated camphene	See Toxaphene		
2675776	Chlorneb	508	608.1	
95794	5-Chloro-2-methylaniline			8270A
59507	4-Chloro-3-methylphenol		604/625	8040/8270A
59507	4-Chloro-m-cresol	See 4-Chloro-3-methylphenol		
79118	Chloroacetic acid	See Monochloroacetic acid		
106478	4-Chloroaniline			8270A
95501	Chloroben	See 1,2-Dichorobenzene		
108907	Chlorobenzene	503.1/502.2/502.1/524.2	602/624/601	8020/8260/8010/8021
501156	Chlorobenzilate	508	608.1/617	8270A
2051607	2-Chlorobiphenyl	525.1		
74975	Chlorobromomethane	See Bromochloromethane		
124481	Chlorodibromomethane	See Dibromochloromethane		
7005723	4-Chlorodiphenyl ether	See 4-Chlorophenyl phenyl ether		
75003	Chloroethane	502.2/502.1/524.2	601/624	8010/8021/8260
107073	2-Chloroethanol			8260
75014	Chloroethene	See Vinyl chloride		
110758	2-Chloroethylvinylether		601/624	8010/8260
75014	Chloroethylene	See Vinyl chloride		
67663	Chloroform	502.2/502.1/501.1/510.1/ 524.2/551	601/624	8021/8010/8260
74873	Chloromethane	502.2/502.1/524.2	601/624	8010/8021/8260
6959484	3-Chloromethylpyridinehydrochloride			8270A

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
90131	1-Chloronaphthalene			8270A
91587	2-Chloronaphthalene		625/612	8270A/8120A/8121
95578	2-Chlorophenol	552	604/625	8040/8270A
7005723	4-Chlorophenyl phenyl ether		625/611	8270A/8110
7005723	p-Chlorophenyl phenyl ether	See 4-Chlorophenyl phenyl ether		
5344821	2-Chlorophenyl thiourea	553		
5344821	o-Chlorophenyl thiourea	See 2-Chlorophenyl thiourea		
76062	Chloropicrin	551	618	
126998	Chloroprene			8260
542767	3-Chloropropionitrile			8260
5836102	Chloropropylate		608.1	
2921882	Chlorothalonil	508	608.2	
95498	α-Chlorotoluene	See 2-Chlorotoluene		
95498	2-Chlorotoluene	502.2/502.1/503.1/524.2		8010/8021/8260
106434	4-Chlorotoluene	502.2/502.1/503.1/524.2		8010/8021/8260
106434	p-Chlorotoluene	See 4-Chlorotoluene		
95498	o-Chlorotoluene	See 2-Chlorotoluene		
101213	Chlorpropham	507	632	
2921882	Chlorpyrifos		622/113	8140/8141A
5598130	Chlorpyrifos methyl		622/113	
1897456	Chlorthal	See DCPA		
7440473	Chromium	218.1/218.2/200.7/200.9	218.1/218.2/200.7 / 200.9	6010A
7440473	Chromium-Hexavalent (Cr+6)	218.6		

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
218019	Chrysene	550.1/525.1	610/625	8270A/8100
100425	Cinnamene	See Styrene		
101213	CIPC	See Chlorpropham		
56724	Co-Ral	See Coumaphos		
7440484	Cobalt	219.1/219.2/200.7/200.9	219.1/219.2/200.7 / 200.9	6010A
COLOR	Color		110.2	
7440508	Copper	220.1/220.2/200.9/200.7	220.1/220.2/200.9 / 200.7	6010A
L'INDEX	Corrosivity	SM2330	SM2330	
2164172	Cotoran	See Fluometuron		
56724	Coumaphos		622	8140/8270A/8141A
	Coumarin Dyes			8321
13071799	Counter	See Terbufos		
120718	p-Cresidine			8270A
108394	m-Cresol	See 3-Methylphenol		
95487	o-Cresol	See 2-Methylphenol		
106445	p-Cresol	See 4-Methylphenol		
123739	Crotonaldehyde	554		
7700176	Crotoxyphos			8270A
10453868	Cryson	See Resmethrin		
98828	Cumene	See Isopropylbenzene		
21725462	Cyanazine		629	
57125F	Cyanide, Free	335.3	335.3	

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
57125T	Cyanide, Total	335.3	335.3	
1134232	Cycloate	507	634	
108941	Cyclohexanone	554		
131895	2-Cyclohexyl-4,6-dinitrophenol			8270A
121824	Cyclonite	See Hexahydro-1,3,5-trinitro-1,3,5-triazine		
54460467	Cycloprate		616	
121824	Cyclotrimethylene trinitramine	See Hexahydro-1,3,5-trinitro-1,3,5-triazine		
60515	Cygon	See Dimethoate		
137304	Cymate	See Ziram		
99876	p-Cymene	See p-isopropyltoluene/4-Isopropyltoluene		
121755	Cythion	See Malathion		
9501007	Cytrolane	See Mephosfolan	130	
94757	2,4-D	515.1/555	615	8150B/8151
39196184	Dacamox	See Thiofanox		
1897456	Daconil	See Chlorothalonil		
1897456	Dacthal	See DCPA		
75990	Dalapon	515.1	615	8150B/8151
94826	2,4-DB	515.1/555	615	8150B/8151
96128	DBCP	504/502.2/524.2/551		8011/8010/8260
1897456	DCPA	508	608.2	
DCPAAM	DCPA acid metabolites	515.1		8151
72548	4,4'-DDD	508	608/617/625	8080B/8081/8270A
72559	4,4'-DDE	508	608/617/625	8080B/8081/8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
50293	4,4'-DDT	508	608/617/625	8080B/8081/8270A
62737	DDVP	See Dichlorvos		
10CL2PH	Decachlorobiphenyl	508A		
112312	Decanal	554		
2385855	Dechlorane	See Mirex		
8065483	Demeton		622/614	
298033	Demeton-O			8140/8270A
126750	Demeton-S			8141A/8270A
2675776	Demosan	See Chlorneb		
10605217	Derosal	See Carbendazim		
115902	Desanit	See Fensulfothion		
15299997	Devrinol	See Napropamide		
103231	Di(2-ethyl-hexyl) adipate	See Bis(2-ethylhexyl) adipate		
117817	Di(2-ethyl-hexyl) phthalate	See Bis(2-ethylhexyl) phthalate		
84722	Di-n-butyl phthalate	525.1/506	625/606	8270A/8060/8061
117840	Di-n-octyl phthalate	506	625/606	8270A/8060/8061
29044	Di-Syston	See Disulfoton		
2303164	Diallate (cis or trans)			8270A
92875	p-Diaminobiphenyl	See Benzidine		
95807	2,4-Diaminotoluene			8270A
84764	Diamyl phthalate			8061
119904	Dianisidine	See 3,3'-Dimethoxybenzidine		
333415	Diazinon	507	622/614	8140/8141A

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
192654	Dibenzo(a,e) pyrene			8270A
53703	Dibenzo(a,h) anthracene	550.1/525.1	610/625	8270A/8100/8310
224420	Dibenzo(a,j) acridine			8270A
132649	Dibenzofuran			8270A
300765	Dibrom	See Naled		
96128	1,2-Dibromo-3-chloropropane	See DBCP		
631641	Dibromoacetic acid	552		
3252435	Dibromoacetonitrile	551		
124481	Dibromochloromethane	502.2/502.1/501.1/510.1/ 524.2	601/624	8021/8010/8260
96128	Dibromochloropropane	see DCBP		
106934	1,2-Dibromoethane	See EDB		
74953	Dibromomethane	502.2/502.1/524.2		8010/8021/8260
106934	1,2-Dibromoethane	See**EDB		
1918009	Dicamba	515.1/555	615	8150B/8151
117806	Dichlone			8270A
99309	Dichloran		608.1/617	
764410	1,4-Dichloro-2butene			8260
96231	1,3-Dichloro-2-propanol			8260
513882	1,1-Dichloro-2-propanone	551		
79436	Dichloroacetic acid	552		
3252435	Dichloroacetonitrile	551		
95501	1,2-Dichlorobenzene	502.2/503.1/502.1/524.2	602/601/624/625/ 612	8010/8020/8021/8260/8270A/81 20A/ 8121

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
541731	1,3-Dichlorobenzene	502.2/503.1/502.1/524.2	602/601/624/625/ 612	8010/8020/8021/8260/8270A/8120A/ 8121
106467	1,4-Dichlorobenzene	502.2/503.1/502.1/524.2	602/601/624/625/ 612	8010/8020/8021/8260/8270A/8120A/ 8121
541731	m-Dichlorobenzene	See 1,3-Dichorobenzene		
95501	o-Dichlorobenzene	See 1,2-Dichorobenzene		
106467	p-Dichlorobenzene	See 1,4-Dichorobenzene		
91941	3,3'-Dichlorobenzidine	553	625/605	8270A
51365	3,5-Dichlorobenzoic acid	515.1/553		8151
16605917	2,3-Dichlorobiphenyl	525.1		
75274	Dichlorobromomethane	See Bromodichloromethane		
75718	Dichlorodifluoromethane	502.2/502.1/524.2	601	8010/8021/8260
75343	1,1-Dichloroethane	502.2/502.1/524.2	601/624	8260/8010/8021
107062	1,2-Dichloroethane	502.2/502.1/524.2	601/624	8021/8010/8260
75354	1,1-Dichloroethene	See 1,1-Dichloroethylene		
156594	cis-1,2-Dichloroethene	524.2/502.2/502.1		8010/8021/8260
156605	trans-1,2-Dichloroethene	524.2/502.2/502.1	601/624	8010/8021/8260
111444	Dichloroethyl ether	See Bis(2-chloroethyl) ether		
111911	Dichloroethyl formal	See Bis(2-chloroethoxy) methane		
75354	1,1-Dichloroethylene	502.2/502.1/524.2	601/624	8010/8021/8260
156594	cis-1,2-Dichloroethylene	See cis-1,2-Dichloroethene		
156605	trans-1,2-Dichloroethylene	See trans-1,2-Dichloroethene		
97176	Dichlorofenthion		622.1	

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
75092	Dichloromethane	See Methylene chloride		
120832	2,4-Dichlorophenol	552	604/625	8040/8270A/8275
87650	2,6-Dichlorophenol			8040/8270A
120365	Dichloroprop	515.1/555	615	8150B/8151
563586	1,1-Dichloropropene	502.2/502.1/524.2		8010/8021/8260
78875	1,2-Dichloropropane	524.2/502.2/502.1	601/624	8010/8021/8260
142289	1,3-Dichloropropene	524.2/502.2/502.1		8021/8260
590207	2,2-Dichloropropene	524.2/502.2/502.1		8021/8260
10061015	cis-1,3-Dichloropropene	524.2/502.2/502.1	624/601	8010/8021/8260
10061026	trans-1,3-Dichloropropene	524.2/502.2/502.1	624/601	8010/8021/8260
563586	1,1-Dichloropropylene	See 1,1-Dichloropropene		
10061015	cis-1,3-Dichloropropylene	See cis-1,3-Dichloropropene		
10061026	trans-1,3-Dichloropropylene	See trans-1,3-Dichloropropene		
62737	Dichlorovos	507	622	8140/8141A/8321/ 8270A
97234	Dichlorophen		604.1	
115322	Dicofol		617	
141662	Dicrotophos			8270A
84617	Dicyclohexyl phthalate			8061
60571	Dieldrin	505/508	608/617/625	8080B/8081/8270A
1464535	1,2,3,4-Diepoxybutane			8260
DIESELFL	Diesel fuel			8015 California modified
84662	Diethyl phthalate	525.1/506	606/625	8270A/8060/8061
64675	Diethyl sulfate			8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
56531	Diethylstilbestrol			8270A
2425061	Difolatan	See Captafol		
84753	Dihexyl phthalate (DHP)			8061
84695	Diisobutyl phthalate (DIBP)			8061
60515	Dimethoate		130	8141A/8270A/8321
119904	3,3'-Dimethoxybenzidine	553		8270A
131113	Dimethyl phthalate	525.1/506	606/625	8270A/8060/8061
60117	Dimethylaminoazobenzene			8270A
57976	7,12-Dimethylbenz(a)anthracene			8270A
612828	3,3'-Dimethylbenzidine	553		8270A
62759	Dimethylnitrosamine	See n-Nitrosodimethylamine		
122098	α,α-Dimethylphenethylamine			8270A
105679	2,4-Dimethylphenol		604/625	8040/8270A
534521	4,6-Dinitro-2-cresol	See 4,6-Dinitro-2-methylphenol		
534521	4,6-Dinitro-2-methylphenol		604/625	8270A/8040
534521	4,6-Dinitro-o-cresol	See 4,6-Dinitro-2-methylphenol		
528290	1,2-Dinitrobenzene			8270A
99650	1,3-Dinitrobenzene			8270A/8330
100254	1,4-Dinitrobenzene			8270A
99650	m-Dinitrobenzene	See 1,3-Dinitrobenzene		
528290	o-Dinitrobenzene	See 1,2-Dinitrobenzene		
100254	p-Dinitrobenzene	See 1,4-Dinitrobenzene		
51285	2,4-Dinitrophenol		625/604	8040/8270A

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CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
121142	2,4-Dinitrotoluene		625/609	8270A/8090/8330
606202	2,6-Dinitrotoluene		625/609	8270A/8090/8330
39300453	Dinocap			8270A
88857	Dinoseb	515.1/555	122/615	8150B/8151/8270A
103231	Dioctyl adipate	See Bis(2-ethylhexyl) adipate		
117817	Dioctyl phthalate	See Bis(2-ethylhexyl) phthalate		
6988212	Dioxacarb			8318
123911	1,4-Dioxane			8260
1746016	Dioxins	Call lab first, 1613		
957517	Diphenamid	507		
122394	Diphenylamine		620	8270A/8275
57410	5,5-Diphenylhydantoin			8270A
12267	1,2-Diphenylhydrazine			8270A
86306	Diphenylnitrosamine	See n-Nitrosodiphenylamine		
709988	Dipram	See Propanil		
85007	Diquat	549		
2475447	Disperse Blue 14			8321
2475469	Disperse Blue 3			8321
17464914	Disperse Brown 1			8321
730405	Disperse Orange 3			8321
5261314	Disperse Orange 30			8321
2872528	Disperse Red 1			8321
2832408	Disperse Red 13			8321

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	**CHEMICAL**	**SAFE DRINKING WATER ACT**	**CLEAN WATER ACT**	**RESOURCE CONSERVATION AND RECOVERY ACT**
3180812	Disperse Red 5			8321
17418585	Disperse Red 60			8321
6439538	Disperse Yellow 5			8321
O2'D	Dissolved Oxygen (DO)	360	360	
298044	Disulfoton	507	614/622	8140/8141A/8321/ 8270A
2497065	Disulfoton sulfone	507		
2497076	Disulfoton sulfoxide	507		
12122677	Dithane Z	See Zineb		
298044	Dithio-Systox	See Disulfoton		
330541	Diuron	553	632/109	
88857	DNBP	See Dinoseb		
53421	DNC	See 4,6-Dinitro-2-methylphenol		
534521	DNOC	See 4,6-Dinitro-2-methoxyphenol		
76062	Dolochlor	See Chloropicrin		
75990	Dowpon	See Dalapon		
120365	2,4-DP	See Dichlorprop		
330541	Drexel	See Diuron		
76448	Drinox	See Heptachlor		
51218452	Dual	See Metolachlor		
2921882	Dursban	See Chlorpyrifos		
944229	Dyfonate	See Fonophos		
52686	Dylox	See Trichlorofon		
106934	EDB	504/551/502.2/524.2	618	8011/8010/8021/8260

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
959988	α-Endosulfan	See Endosulfan I		
33213659	β-Endosulfan	See Endosulfan II		
959988	Endosulfan I	508	625/608/617	8270A/8080B/8081
33213659	Endosulfan II	508	625/608/617	8270A/8080B/8081
1031078	Endosulfan sulfate	508	625/608/617	8270A/8080B/8081
145733	Endothall	548		
72208	Endrin	505/508/525.1	608/617/625	8080B/8081/8270A
7421934	Endrin aldehyde	508	608/617/625	8080B/8081/8270A
53494705	Endrin ketone			8270A
957517	Enide	See Diphenamid		
106898	Epichlorohydrin			8260
2104645	EPN			8141A/8270A
759944	Eptam	See EPTC		
759944	EPTC	507	634	
64175	Ethanol			8260
563122	Ethion		614	8270A
13194484	Ethoprop	507	622	8140/8141A
64175	Ethyl alcohol	See Ethanol		
100414	Ethyl Benzene	502.2/503.1/524.2	602/642	8020/8260/8021
51796	Ethyl carbamate			8270A
107120	Ethyl cyanide	See Propionitrile		
97632	Ethyl methacrylate			8260
62500	Ethylmethanesulfonate			8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
56382	Ethyl parathion	See Parathion		
84662	Ethyl phthalate	See Diethyl phthalate		
106934	Ethylene Dibromide	See EDB		
107211	Ethylene glycol	NY APC-44		
75218	Ethylene oxide			8260
96457	Ethylene thiourea	553/509		
2593159	Etridiazole	508	608.1	
502556	EXD		630.1	
52857	Famphur		622.1/130	8270A
22224926	Fenamiphos	507		
60168889	Fenarimol	507	633.1	
122145	Fenitrothin		622.1	
115902	Fensulfothion		622	8140/8141A/8270A/ 8321
55389	Fenthion		622	8140/8141A/8270A
101428	Fenuron		632	
4482557	Fenuron-TCA		632	
14484641	Ferbam		630/630.1	
33245395	Fluchloralin			8270A
2164172	Fluometuron		632	
206440	Fluoranthene	550.1	610/625	8270A/8100
86737	Fluorene	550.1/525.1	610/625	8270A/8100
63590170	Fluorescent Brightener 236			8321
8066055	Fluorescent Brightener 61			8321

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CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
16984488	Fluoride	300.0	300.0	
59756604	Fluridone	507		
944229	Fonophos		622.1	
50000	Formaldehyde	554		
76131	Freon 113	502.2/524	601/624	8010
GAS	Gasoline fuel			8015 California modified
1610179	Gesatamin	See Atraton		
139402	Gesomil	See Propazine		
GLYCOLT	Glycols, Total		NY APC-44	NY APC-44
1071836	Glyphosate	547		
1910425	Gramoxone	See Paraquat		
555373	Granurex	See Neburon		
86500	Guthion	See Azinophos methyl		
HARD	Hardness	130	130	
11841	HCB	See Hexachlorobenzene		
319846	α-HCH	See α-BHC		
319857	β-HCH	See β-BHC		
58899	γ-HCH	See γ-BHC		
319868	Δ-HCH	See δ-BHC		
	HEHP	See Hexy-2-ethylhexyl phthalate		
60571	HEOD	See Dieldrin		
76448	Heptachlor	505/508/525.1	625/608/617	8080B/8081/8270A
1024573	Heptachlor epoxide	505/508/525.1	625/608/617	8080B/8081/8270A

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CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
52663715	2,2',3,3',4,4',6-Hepta-chlorobiphenyl	525.1		
111717	Heptaldehyde	See Heptanal		
111717	Heptanal	554		8315
502556	Herbisan	See EXD		
118741	Hexachlorobenzene	505/508/525.1	625/612	8270A/8081/8120A/ 8121/8275
60145224	2,2',4,4',5,6'-Hexachlorobiphenyl	525.1		
87683	Hexachlorobutadiene	502.2/524.2/503.1	625/612	8021/8270A/8260/ 8120A/8121
77744	Hexachlorocyclopentadiene	505/525.1	625/612	8270A/8081/8120A/ 8121
67721	Hexachloroethane		625/612	8270A/8120A/8121
70304	Hexachlorophene		604.1	8270A
1888717	Hexachloropropene			8270A
1888717	Hexachloropropylene	See Hexachloropropene		
121824	Hexahydro-1,3,5-trinitro-1,3,5-triazine			8330
680319	Hexamethyl phosphoramide			8270A
66251	Hexanal	554		
591786	2-Hexanone			8260
51235042	Hexazinone	507	109	
75673164	Hexyl 2-ethylhexyl phthalate(HEHP)			8061
309002	HHDN	See Aldrin		
FCHR	Hydraulic fluid	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
123319	Hydroquinone			8270A
16655826	3-Hydroxycarbofuran	531.1		8318

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CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
7600502	5-Hydroxydicamba	515.1/555		8151
78977	2-Hydroxypropionitrile			8260
314409	Hyvar	See Bromacil		
886500	Igran	See Terbutryn		
732116	Imidan	See Phosmet		
193395	Indeno-(1,2,3-cd) pyrene	550.1/525.1	610/625	8270A/8100
74884	Iodomethane			8260
122429	IPC	See Propham		
7439896	Iron	236.1/200.7/200.9	236.1/200.7/200.9	6010A
78831	Isobutanol	See Isobutyl alcohol		
78831	Isobutyl alcohol			8260
465736	Isodrin		617	8270A
78591	Isophorone		625/609	8270A/8090
98828	Isopropylbenzene	524.2/502.2/503.1		8021/8260
99876	4-Isopropyltoluene	See p-Isopropyltoluene		
99876	P-Isopropyltoluene	524.2/502.2		8021/8260
120581	Isosafrole			8270A
JP10	JP-10	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
JP4	JP-4	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
JP5	JP-5	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	

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CASRN	**CHEMICAL**	**SAFE DRINKING WATER ACT**	**CLEAN WATER ACT**	**RESOURCE CONSERVATION AND RECOVERY ACT**
JP7	JP-7	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
JP8	JP-8	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
115322	Kelthane	See Dicofol		
143500	Kepone			8270A
23950585	Kerb	See Pronamide		
42588374	Kinoprene		616	
7727379	Kjeldahl Nitrogen		351.2	
137417	KN Methyl		630/630.1	
14484641	Knockmate	See Ferbam		
58899	Kwell	See γ-BHC		
L'IND	Langlier index	SM2330	SM2330	
16752775	Lannate	See Methomyl		
15972608	Lasso	See Alachlor		
7439921	Lead	239.1/239.2/200.9/200.7		6010A
21609905	Leptophos			8270A
21087649	Lexone	See Metribuzin		
58899	Lindane	See γ-BHC		
330552	Linuron	553	632/109	
7440042	Lithium	200.7	200.7	6010A/7000A
330552	Lorox	See Linuron		

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
FCHR	Lube oil	MOD EPA 8015, GC/MS in house method.	MOD EPA 8015, GC/MS in house method.	
23184669	Machete	See Butachlor		
7439954	Magnesium	242.1/200.7	242.1/200.7	6010A
121755	Malathion		614/130	8141A/8270A
109316	Maleic anhydride			8270A
109773	Malonic dinitrile	See Malononitrile		
109773	Malononitrile			8260
8065676	Mancozeb		630	
12327382	Maneb		630	
7439965	Manganese	243.1/243.2/200.9/200.7	243.1/243.2/200.9 / 200.7	6010A
591786	MBK	See 2-Hexanone		
120785	MBTS		637	
94746	MCPA	555	615	8150B/8151
93652	MCPP	555	615	8150B/8151
93652	Mecoprop	See MCPP		
104518	MEK	See 2-Butanone		
9501007	Mephosfolan	See Cytrolane	130	
149304	Mercaptobenzothiazole		640	
7439976	Mercury	245.1		
150505	Merphos	507	622	8140/8141A/8321
72333	Mestranol			8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
2032657	Mesurol	See Methiocarb		
2032599	Metacil	See Aminocarb		
126987	Methacrylonitrile			8260
137428	Metham		630/630.1	
50000	Methanal	See Formaldehyde		
91805	Methapyrilene			8270A
2032657	Methiocarb	531.1	632	8318
16752775	Methomyl	531.1	632/109	8318/8321
40596698	Methoprene		616	
72435	Methoxychlor	505/508/525.1	608.2/617	8080B/8081/8270A
123739	β-Methyl acrolein	See Crotonaldehyde		
74839	Methyl bromide	see bromomethane		
71556	Methyl chloroform	See 1,1,1-Trichloroethane		
5598130	Methyl Dursban	See Chlorpyrifos methyl		
78933	Methyl ethyl ketone	See 2-Butanone		
74884	Methyl iodide	See Iodomethane		
108101	Methyl isobutyl ketone	See 4-Methyl-2-pentanone		
80626	Methyl methacrylate			8260
66273	Methyl methanesulfonate			8270A
950356	Methyl paraoxon	507		
298000	Methyl parathion	See Parathion methyl		
108101	4-Methyl-2-pentanone			8015/8260
479458	Methyl-2,4,6-trinitrophenylnitramine			8330

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
534521	2-Methyl-4,6-dinitrophenol	See 4,6-Dinitro-2-methylphenol		
591786	Methyl-n-butyl ketone	See 2-Hexanone		
56495	3-Methylcholanthrene			8270A
75092	Methylene chloride	502.2/502.1/524.2	601/624	8010/8021/8260
101144	4,4'-Methylenebis(2-chloraniline)			8270A
104518	Methylethyl Ketone	See 2-Butanone		
91576	2-Methylnaphthalene			8270A
95487	2-Methylphenol			8270A
108394	3-Methylphenol			8270A
106445	4-Methylphenol			8270A
109068	2-Methylpyridine	See 2-Picoline		
9006422	Metiram	See Polyram		
51218452	Metolachlor	507		
72435	Metox	See Methoxychlor		
21087649	Metribuzin	507		
7786347	Mevinphos	507	622	8140/8141A/8270A
315184	Mexacarbate		632	8270A
83794	Mexide	See Rotenone		
113384	MGK 264	507		
136458	MGK 264-A		633.1	
136458	MGK 264-B		633.1	
113384	MGK 326		633.1	
108101	MIBK	See Methylisobutyl Ketone		

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
2385855	Mirex		617	8270A
13194484	Mocap	See Ethoprop		
FCHR	Mogas			Fuel Characterization
2212671	Molinate	507	634	
7439987	Molybdenum	200.7/200.8	200.7/200.8	6010A
79083	Monobromoacetic acid	552		
79118	Monochloroacetic acid	552		
108907	Monochlorobenzene	See Chlorobenzene		
6923224	Monocrotophos			8141A/8321/8270A
150685	Monuron	553	632	
140410	Monuron-TCA		632	
56724	Muscatox	See Coumaphos		
142596	Nabam		630/630.1	
138932	Nabonate		630.1	
300765	Naled		622	8140/8141A/8321/ 8270A
91203	Naphthalene	502.2/550.1/524.2	625/610	8270A/8100/8260/8021
130154	α-Naphthoquinone	See 1,4-Naphthoquinone		
130154	1,4-Naphthoquinone			8270A/8090
134327	α-Naphthylamine	See 1-Naphthylamine		
91598	β-Naphthylamine	See 2-Naphthylamine		
134327	1-Naphthylamine			8270A
91598	2-Naphthylamine			8270A
15299997	Napropamide	507		

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
555373	Neburon		632	
22224926	Nemacur	See Fenamiphos		
96128	Nemagon	See DBCP		
8011663	Niacide		630	
7440020	Nickel	249.1/249.2/200.9/200.7	249.1/249.2/200.9 / 200.7	6010A
54115	Nicotine			8270A
1479755	Nitrate	353.2	353.2	
1479765	Nitrite	353.2	353.2	
99592	5-Nitro-o-anisidine			8270A
99558	5-Nitro-o-toluidine			8270A
602879	5-Nitroacenaphthene			8270A
88744	2-Nitroaniline			8270A
99092	3-Nitroaniline			8270A
100016	4-Nitroaniline			8270A
99092	m-Nitroaniline	See 3-Nitroaniline		
88744	o-Nitroaniline	See 2-Nitroaniline		
10016	p-Nitroaniline	See 4-Nitroaniline		
98953	Nitrobenzene		625/609	8270A/8090/8330
92933	4-Nitrobiphenyl			8270A
1836755	Nitrofen			8270A
88755	2-Nitrophenol		625/604	8270A/8040
100027	4-Nitrophenol	515.1	625/604	8270A/8040/8151
88755	o-Nitrophenol	See 2-Nitrophenol		

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
100027	p-Nitrophenol	See 4-Nitrophenol		
56575	Nitroquinoline-1-oxide			8270A
924163	N-Nitrosodi-n-butylamine			8270A
621647	N-Nitrosodi-n-propylamine		625/607	8270A/8070
55185	N-Nitrosodiethylamine			8270A
62759	N-Nitrosodimethylamine		625/607	8270A/8070
86306	N-Nitrosodiphenylamine		625/607	8270A/8070
10595956	N-Nitrosomethylethylamine			8270A
59892	N-Nitrosomorpholine			8270A
100754	N-Nitrosopiperidine			8270A
930552	N-Nitrosopyrrolidine			8270A
88722	2-Nitrotoluene			8330
99081	3-Nitrotoluene			8330
99990	4-Nitrotoluene			8330
99081	m-Nitrotoluene	See 3-Nitrotoluene		
88722	o-Nitrotoluene	See 2-Nitrotoluene		
99990	p-Nitrotoluene	See 4-Nitrotoluene		
39765805	trans-Nonachlor	525.1		
124196	Nonanal	554		
124196	n-Nonyl aldehyde	See Nonanal		
27314132	Norflurazon	507		
3244904	NPD	See Aspon		
57749	Octa-Klor	See Chlordane		

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
57749	Octachlor	See Chlordane		
40186718	2,2',3,3',4,5',6,6'-Octa-chlorobiphenyl	525.1		
2691410	Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetraocine			8330
152169	Octamethyl pyrophosphoramide			8270A
124130	Octanal	554		
124130	n-Octyl aldehyde	See Octanal		
ODOR	Odor	140.1	140.1	
OG	Oil and Grease	413.0	413.0	
2212671	Ordram	See Molinate		
ORGC	Organic carbon (Total)		415.1	
1426544	Orthophosphate		365.1	
19044883	Oryzalin		638	
7439932	Osmium	200.7	200.7	6010A/7000A
23135220	Oxamyl	531.1	632/109	
75218	Oxirane	See Ethylene oxide		
108601	2,2'-oxybis(1-chloropropane)	See Bis(2-chloroisopropyl)ether		
101804	4,4'-Oxydianiline			8270A
10028156	Ozone	SM4500	SM4500	
106467	Paracide	See 1,4-Dichorobenzene		
1910425	Paraquat	549		
56382	Parathion		614	8141A/8270A
56382	Parathion ethyl	See Parathion		
298000	Parathion methyl		622/122/614	8140/8141A/8321/ 8270A

Except as not[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
PCBSCRN	PCBs	See Aroclor		
12378PCF	PCDF	Call lab first, 1613.		
82688	PCNB		608.1/617	8270A
87865	PCP	515.1/555/525.1	604/625	8040/8151/8270A
1114712	Pebulate	507	634	
608935	Pentachlorobenzene			8121/8270A
60233252	2,2',3',4,6-Pentachlorobiphenyl	525.1		
76017	Pentachloroethane			8260
82688	Pentachloronitrobenzene	See PCNB		
87865	Pentachlorophenol	See PCP		
110623	Pentanal	554		
67721	Perchloroethane	See Hexachloroethane		
127184	Perchloroethylene	See Tetrachloroethene		
1888717	Perchloropropene	See Hexachloropropene		
1888717	Perchloropropylene	See Hexachloropropene		
51877748	Permethrin	508	608.2	
54774457	cis-Permethrin	508		
52645531	trans-Permethrin	508		
72560	Perthane		617	
PH	pH	150.1	150.1	
62442	Phenacetin			8270A
85018	Phenanthrene	550.1/525.1	610/625	8270A/8100
50066	Phenobarbital			8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
108952	Phenol		604/625	8040/8270A/8275
108952	Phenol, Total		420.2	
108952	Phenols, urine		420.2 (mod)	
108985	Phenyl mercaptan	See Thiophenol		
62533	Phenylamine	See Aniline		
106503	1,4-Phenylenediamine			8270A
298022	Phorate		622/130	8270A/8140/8321
2310170	Phosalone			8270A
7786347	Phosdrin	See Mevinphos		
732116	Phosmet		622.1	8270A
13171216	Phosphamidon			8270A
1071836	N-Phosphonomethyl glycine	See Glyphosate		
7723140	Phosphorus, total		365.1	
121755	Phosphothion	See Malathion		
85449	Phthalic anhydride			8270A
1918021	Picloram	515.1/555		8151
109068	α-Picoline	See 2-Picoline		
109068	2-Picoline			8260/8270A
120627	Piperonyl sulfoxide			8270A
PCF	Polychlorinated Dibenzofurans	Call lab first, 1613.		
9006422	Polyram		630	
7440097	Potassium	258.1/200.7	258.1/200.7	6010A
52645531	Pounce	See Permethrin		

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
1610180	Pramitol	See Prometon		
741582	Prefan	See Bensulide		
1610180	Primatol	See Prometon		
139402	Primatol P	See Propazine		
7287196	Primatol Q	See Prometryn		
122349	Primatol S	See Simazine		
122349	Princep	See Simazine		
2631370	Promecarb			8318
1610180	Prometon	507	619	
7287196	Prometryn	507	619	
23950585	Pronamide	507	633.1	8270A
1918167	Propachlor	508	608.1/102	
123386	Propanal	554		
709988	Propanil		632.1	
107197	Propargyl alcohol			8260
139402	Propazine	507	619/409	
107028	2-Propenal	See Acrolein		
122429	Propham		632	
13194484	Prophos	See Ethoprop		
57578	β-Propiolactone			8260
107120	Propionitrile			8260
114261	Propoxur	See Baygon		
107108	n-Propylamine			8260

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
103651	Propylbenzene	See n-Propylbenzene		
103651	n-Propylbenzene	524.2/502.2/503.1		8021/8260
51525	Propylthiouracil			8270A
34643464	Prothiophos	See Tokuthion		
129000	Pyrene	550.1/525.1	610/625	8270A/8100
110861	Pyridine			8260/8270A
106514	Quinone	See p-Benzoquinone		
1918167	Ramrod	See Propachlor		
85007	Reglone	See Diquat		
5598130	Reldan	See Chlorpyrifos methyl		
RESF	Residue, Filterable	160.1	160.1	
RESNF	Residue, Nonfilterable		160.2	
RESS	Residue, Settleable		160.5	
REST	Residue, Total	160.3	160.3	
RESTV	Residue, Volatile		160.4	
10453868	Resmethrin		616	
108463	Resorcinol			8270A
1134232	Ro-Neet	See Cycloate		
709988	Rogue	See Propanil		
299843	Ronnel		622	8140/8141A
83794	Rotenone	553	635	
1071836	Roundup	See Glyphosate		
94597	Safrole			8270A

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
2104645	Santox	See EPN		
26259450	Secbumeton		619	
7782492	Selenium	270.2/200.9	270.2/200.9	6010A
63252	Sevin	See Carbaryl		
1982496	Siduron	553	632	
14808607	Silica		370.1	
7440224	Silver	272.1/272.2/200.7/200.9	272.1/272.2/200.7 / 200.9	6010A
93721	Silvex	515.1/555	615	8150B/8151
122349	Simazine	507/525.1	619/409	
1014706	Simetryn	507	619	
5902512	Sinbar	See Terbacil		
534521	Sinox	See 4,6-Dinitro-2-methylphenol		
7440235	Sodium	273.1/200.7	273.1/200.7	6010A
128041	Sodium dimethyldithiocarbamate		630/630.1	
85869	Solvent Red 23			8321
6535428	Solvent Red 3			8321
59756604	Sonar	See Fluridone		
SPCON	Specific conductance	120.1	120.1	
333415	Spectracide	See Diazinon		
34014181	Spike	See Tebuthiuron		
22248799	Stirofos	507	622	8140/8141A/8270A
8001501	Strobane		617	
7440246	Strontium	200.7	200.7	6010A

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
57249	Strychnine			8270A/8321
100425	Styrene	502.2/503.1/524.2		8021/8260
95067	Sulfallate			8270A
1480879	Sulfate	300.0/375.2	300.0/375.2	
1849625	Sulfides	376.1	376.1	
1426545	Sulfite		377.1	
3689245	Sulfotep			8141A
35400432	Sulprofos	See Bolstar		
60168889	Sumithion	See Fenitrothion		
121755	Sumitox	See Malthion		
470906	Supona	See Chlorfenvinphos		
MBAS	Surfactant-MBAS		425.1	
19044883	Surflan	See Oryzalin		
2008415	Sutan	See Butylate		
1918189	Swep		632	
8065483	Systox	See Demeton		
93765	2,4,5-T	515.1/555	615	8150B/8151
76039	TCA	See Trichloroacetic acid		
1746016	2,3,7,8-TCDD	See Dioxin		
79016	TCE	See Trichlorothylene		
21564170	TCMTB		637	
72548	TDE	See 4,4-DDD		
34014181	Tebuthiuron	507		

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
150685	Telvar	See Monuron		
116063	Temik	See Aldicarb		
TEMP	Temp	170.1	170.1	
107493	TEPP			8141A/8270A
5902512	Terbacil	507	109	
13071799	Terbufos	507	130	8270A
5915413	Terbuthylazine		619	
886500	Terbutryn	507	619	
82688	Terrachlor	See PCNB		
115902	Terracur P	See Fensulfothion		
2593159	Terrazole	See Etridiazole		
137268	Tersan	See Thiram		
634662	1,2,3,4-Tetrachlorobenzene			8121
634902	1,2,3,5-Tetrachlorobenzene			8121
95943	1,2,4,5-Tetrachlorobenzene			8121/8270A
2437798	2,2',4,4'- Tetrachlorobiphenyl	525.1		
1746016	2,3,7,8-Tetrachlorodibenzodioxin	See Dioxin		
630206	1,1,1,2-Tetrachloroethane	524.2/502.2/502.1		8021/8260
79345	1,1,2,2-Tetrachloroethane	524.2/502.2/502.1	601/624	8021/8010/8260
127184	Tetrachloroethene	502.2/502.1/503.1/524.2/ 551	624/601	8010/8021/8260
127184	Tetrachloroethylene	See Tetrachloroethene		
58902	2,3,4,6-Tetrachlorophenol			8270A
22248799	Tetrachlorvinphos	See Stirofos		

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
107493	Tetraethyl pyrophosphate	See TEPP		
31330639	Tetrazene			8331
7440280	Thallium	200.7/200.9	200.7/200.9	6010A
298022	Thimet	See Phorate		
28249776	Thiobencarb	507(CA only)		
959988	Thiodan I	See Endosulfan I		
33213659	Thiodan II	See Endosulfan II		
39196184	Thiofanox			8321
297972	Thionazin		622.1	8270A
108985	Thiophenol			8270A
137268	Thiram		630/630.1	
1114712	Tillam	See Pebulate		
7440315	Tin	200.7/200.9	200.7	6010A
7440326	Titanium	200.7	200.7	6010A
108703	TNB	See 1,3,5-Trinitrobenzene		
118967	TNT	See 2,4,6-Trinitrotoluene		
TOC	TOC			
34643464	Tokuthion		622	8140/8141A
11904	o-Tolidine	See 3,3'-Dimethylbenzidine		
108883	Toluene	502.2/503.1/524.2	602/624	8020/8021/8260
584849	Toluene diisocyanate			8270A
95534	o-Toluidine			8270A
1918021	Tordon	See Picloram		

Except as no all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
GLYCOLT	Total Glycols	See GLYCOLS		
TOX	Total Organic Halide	See TOX		
TPETRO	Total Petroleum Hydrocarbons		418.1	
TOX	TOX			9020
8001352	Toxaphene	505/508/525.1	122/608/617/625	8080B/8081/8270A
57749	Toxichlor	See Chlordane		
93721	2,4,5-TP	See Silvex		
1582098	Treflan	See Trifluralin		
78320	Tri-p-tolyl phosphate			8270A
43121433	Triademefon	507		
918003	1,1,1-Trichloro-2-propanone	551		
76039	Trichloroacetic acid	552		
545062	Trichloroacetonitrile	551		
87616	1,2,3-Trichlorobenzene	502.2/503.1/524.2		8021/8121/8260
120821	1,2,4-Trichlorobenzene	502.2/503.1/524.2	625/612	8270A/8120A/8121/ 8021/8260
108703	1,3,5-Trichlorobenzene			8121
15862074	2,4,5-Trichlorobiphenyl	525.1		
71556	1,1,1-Trichloroethane	502.2/502.1/524.2/551	601/624	8010/8021/8260
79005	1,1,2-Trichloroethane	524.2/502.2/502.1	601/624	8010/8021/8260
79016	Trichloroethene	See Trichloroethylene		
79016	Trichloroethylene	502.2/524.2/502.1/503.1/ 551	601/624	8021/8260
75694	Trichlorofluoromethane	524.2/502.2/502.1	601/624	8010/8021/8260
52686	Trichlorofon			8321

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
327980	Trichloronate		622	8140/8141A
76062	Trichloronitromethane	See Chloropicrin		
95944	2,4,5-Trichlorophenol			8270A
88062	2,4,6-Trichlorophenol	552	604/625	8040/8270A
96184	1,2,3-Trichloropropane	524.2/502.2/502.1		8021/8260
76131	Trichlorotrifluoroethane	See Freon 113		
41814782	Tricyclazole	507		
126681	O,O,O-Triethyl phosphorothioate			8270A
126681	O,O,O-Triethyl phosphorothionate	See O,O,O-Triethyl phosphorothioate		
126681	Triethyl thiophosphate	See O,O,O-Triethyl phosphorothioate		
1582098	Trifluralin	508	617	8270A
512561	Trimethyl phosphate			8270A
137177	2,4,5-Trimethylaniline			8270A
95636	1,2,4-Trimethylbenzene	524.2/502.2/503.1		8021/8260
108678	1,3,5-Trimethylbenzene	524.2/502.2/503.1		8021/8260
99354	1,3,5-Trinitrobenzene			8270A/8330
118967	2,4,6-Trinitrotoluene			8330
126727	Tris(2,3-dibromopropyl) phosphate			8270A/8321
786196	Trithion	See Carbophenthion		
1982496	Tupersan	See Siduron		
TURB	Turbidity	180.1	180.1	
51796	Urethane	See Ethyl carbamate		
140410	Urox	See Monuron-TCA		

Except as no[illegible] all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
53558251	Vacor		632.1	
110623	n-Valeraldehyde	See Pentanal		
7440622	Vanadium	200.7	200.7	6010A
12327382	Vancide	See Maneb		
137428	Vapam	See Metham		
62737	Vapona	See Dichlorvos		
51235042	Velpar	See Hexazinone		
57749	Velsicol 1068	See Chlordane		
1929777	Vernam	See Vernolate		
1929777	Vernolate	507	634	
76448	Vesicol 104	See Heptachlor		
108054	Vinyl acetate			8260
75014	Vinyl chloride	524.2/502.2/502.1	624/601	8010/8021/8260
107131	Vinyl cyanide	See Acrylonitrile		
75354	Vinylidene chloride	See 1,1-Dichloroethylene		
23135220	Vydate	See Oxamyl		
52857	Warbex	See Famphur		
94746	Weedar	See MCPA		
93765	Weedone	See 2,4,5- T		
108383	m-Xylene	524.2/502.2/503.1	624	8021/8020/8260
95476	o-Xylene	524.2/502.2/503.1	624	8021/8020/8260
106423	p-Xylene	524.2/502.2/503.1	624	8021/8020/8260
105679	2,4-Xylenol	See 2,4-Dimethylphenol		

Except as noted, all method numbers refer to USEPA procedures.

CASRN	CHEMICAL	SAFE DRINKING WATER ACT	CLEAN WATER ACT	RESOURCE CONSERVATION AND RECOVERY ACT
52628258	ZAC		630	
315184	Zectran	See Mexacarbate		
7440666	Zinc	289.1/200.7/200.9		6010A
12122677	Zineb		630/630.1	
297972	Zinophos	See Thionazine		
137304	Ziram		630/630.1	

Except as noted, all method numbers refer to USEPA procedures.

Safe Drinking Water Act (SDWA)

Collection Table

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 110.2 Color	1 Liter P,G	Cool to 4° C	48 Hours
EPA 120.1 Specific Conductance	1 Liter P,G	Cool to 4° C	28 Days
EPA 130 Hardness	N/A	Calculated from Calcium, Magnesium.	N/A
EPA 140.1 Odor	1 Liter P,G	Done on Site	Immediately - Field Test
EPA 150.1 pH	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 160.1 Residue Filterable (TDS)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.2 Residue Nonfilterable (TSS)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.3 Residue Total	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.4 Residue Volatile (Total)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.5 Residue Settleable	1 Liter P,G	Cool to 4° C	48 Hours
EPA 170.1 Temperature	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 180.1 Turbidity	1 Liter P,G	Cool to 4° C	48 Hours
EPA 200.7 Boron	1 Liter, plastic Only	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.7 ICP Screen	1 Liter, plastic or glass, See Note 2.	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.8 ICP-MS Screen	1 Liter, plastic or glass, See Note 2.	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.9 Graphite Furnace	1 Liter, plastic or glass, See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

METHOD		SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 202.1	Aluminum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 204.2	Antimony	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 206.2	Arsenic	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 208.1	Barium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 210.1	Beryllium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 213.1	Cadmium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 215.1	Calcium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 218.1	Chromium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 218.6	Chromium VI	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	48 Hours
EPA 219.1	Cobalt	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 220.1	Copper	1 Liter, plastic or glass, See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 236.1	Iron	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 239.1	Lead	1 Liter, plastic or glass. See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Lev

Note 6: Regulated um of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 242.1 Magnesium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 243.1 Manganese	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 245.1 Mercury	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	28 Days
EPA 249.1 Nickel	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 258.1 Potassium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 270.2 Selenium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 272.1 Silver	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 273.1 Sodium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 279.2 Thallium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 289.1 Zinc	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 300.0 Bromide	1 Liter P,G	Cool to 4° C	28 Days
EPA 300.0 Iodide	1 Liter P,G	Cool to 4° C	24 Hours
EPA 305.1 Acidity	1 Liter P,G	Cool to 4° C	14 Days
EPA 310.1 Alkalinity	1 Liter P,G	Cool to 4° C	14 Days
EPA 325.2 Chloride	1 Liter P,G	Cool to 4° C	28 Days

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 330 Chlorine	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 335.3 Cyanide: Total Amenable to Chlorination	1 Liter P,G	Cool to 4° C, Sodium Hydroxide to pH>12, Add 100 mg/Liter Sodium Thiosulfite if chlorine or sulfide is present.	14 Days
EPA 340.2 Fluoride	1 Liter P	None	28 Days
EPA 350.1 Ammonia	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 351.2 Kjeldahl, Total	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 353.2 Nitrate + Nitrite	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 353.2 Nitrite	1 Liter P,G	Cool to 4° C	48 Hours
EPA 353.2 Nitrate	1 Liter P,G	Cool to 4° C	48 Hours
EPA 360 Dissolved Oxygen	1 Liter G		Immediately - Field Test
EPA 365.1 Phosphates - Total	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 365.1 Phosphates - Ortho	1 Liter G	Cool to 4° C	48 Hours
EPA 370.1 Silica	1 Liter P	Cool to 4° C	28 Days
EPA 375.2 Sulfate EPA 300.0	1 Liter P,G	Cool to 4° C	28 Days
EPA 376.1 Sulfide	1 Liter P,G	Cool to 4° C, Zinc Acetate, + Sodium Hydroxide to pH>9	7 Days
EPA 377 Sulfite	1 Liter P,G	Done on Site	Immediately - Field Test

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 405.1 Biological Oxygen Demand (BOD)	1 Liter P,G	Done on Site	48 Hours - Field Test
EPA 410.4 Total Organic Carbon (TOC)	1 Liter P,G	Cool to 4° C, Sulfuric Acid to $pH<2$	28 Days
EPA 413 Oil and Grease	1 Liter G	Cool to 4° C, Sulfuric Acid to $pH<2$	28 Days
EPA 413 Total Petroleum Hydrocarbon (TPH)	1 Liter G	Cool to 4° C, Sulfuric Acid to $pH<2$	28 Days
EPA 415.1 Chemical Oxygen Demand (COD)	1 Liter P,G	Cool to 4° C, Sulfuric Acid to $pH<2$	28 Days
EPA 420.2 Phenolics	1 Liter G	Cool to 4° C, Sulfuric Acid to $pH<2$	28 Days
EPA 425.1 Surfactants (MBAS)	1 Liter P,G	Cool to 4° C	48 Hours
SM 2330 Corrosivity	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 2330 Langlier Index	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 4500 Ozone	1 Liter P,G	Cool to 4°C	N/A
EPA 501.1 (TTHM)	40 ml. glass with Teflon lined septum and screw cap. Collect in duplicate.	Add 2.5 to 3 mg sodium Thiosulfate per 40 ml if the sample contains residual chlorine. Cool to 4°C.	14 days

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

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Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 502.1 (Halocarbons)	40 ml. glass with Teflon lined septum and screw cap. Collect in duplicate.	If there is chlorine add 3mg sodium thiosulfate to sample vial then adjust to pH <2 using 1:1 HCl in water. Cool to 4°C.	14 days
EPA 502.2 (Halocarbons and Aromatics, can be used instead of 502.1, 503.1 and 501.1)	40 ml. glass with Teflon lined septum and screw cap. Collect in triplicate.	If there is chlorine add 3mg sodium thiosulfate to sample vial then adjust to pH <2 using 1:1 HCl in water. Cool to 4°C.	14 days
EPA 503.1 (Aromatics)	40 ml. glass with Teflon lined septum and screw cap. Collect in duplicate.	If there is chlorine add 3mg sodium thiosulfate to sample vial then adjust to pH <2 using 1:1 HCl in water. Cool to 4°C.	14 days
EPA 504 (EDB, DBCP)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample.	If the samples are chlorinated, add 3 mg of sodium thiosulfate/ 40 ml vial. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Complete analysis within 28 days of collection.
EPA 505 (Organochlorine Pesticides)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample.	If the samples are chlorinated, add 3 mg of sodium thiosulfate/ 40 ml vial. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days after collection - If Heptachlor required, otherwise 14 days.

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

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Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 506 (Phthalates)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 60 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 14 days of collection and complete analysis within 28 days of collection. Protect from light.
EPA 507 (Nitrogen/Phosphorus Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 14 days of collection and complete analysis within 28 days of collection.
EPA 508 (Organochlorine Pesticides + PCB's)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 21 days of collection.
EPA 508A (PCB Confirmation - only if 508/505 is positive)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	No chemical presaervation required. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship by overnight express.	Extract within 14 days of collection and complete analysis within 44 days of collection.
EPA 509 (Ethylene Thiourea)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample. Protect from light.	Keep at 4 degrees centigrade from the time of collection to the time of analysis. Ship on ice by overnight express. Protect from light.	Extract as soon as possible after collection. Store extracts for up to 28 days after collection if stored frozen at -10 degrees centigrade and protected from light.

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

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Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 510.1 (TTHM potential)	40 ml. amber glass vial with Teflon lined septum and screw cap. Collect in duplicate.	None until after the seven days incubation when chlorine residual is present in the sample then add 2.5 to 3 mg sodium Thiosulfate per 40 ml if the sample contains residual chlorine. Cool to 4°C.	14 days
EPA 515.1 (Phenoxy Herbicides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Add 1:1 concentrated HCl:water to pH < 2. If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed Ship on ice by overnight express.	Extract within 14 days of collection and complete analysis within 28 days of collection.
EPA 524.2 (GC/MS Volatiles)	40 mL glass vial w/ Teflon lined screw cap. Cool to 4° C.	Add 25 mg of ascorbic acid to vial as preservative prior to sampling if sample contains residual chlorine. Adjust pH to <2 w/ 1:1 HCl (about 2 drops). Chill to 4°C and maintain at that temperature until anaysis.	14 Days
EPA 525.1 (GC/MS Semi-Volatiles)	1 L amber bottle w/Teflon lined screw cap. Cool to 4° C.	Add 40-50 mg of sodium sulfite or sodium arsenite if sample contains residual chlorine. Adjust pH to <2 using 6N HCl. Chill to 4°C and maintain at that temperature until analysis.	7 Days

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 531.1 (Carbamate Pesticides)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample.	Add 1.2 ml Monochloroacetic acid buffer (pH3) per 40 sample. If chlorinated, add 3 mg sodium thiosulfate per 40 ml sample. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship by overnight express. Prepare monochloroacetic acid buffer by adding 36.855 gram monochloroacetic acid plus 24.538 gram potassium acetate to 256 ml of HPLC grade water.	Analysis must be completed within 28 days of collection if stored at -10 degrees Centigrade and pH 3.
EPA 547 (Glyphosphate)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample.	If chlorinated, add 4 mg sodium thiosulfate per 40 ml sample. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship by overnight express.	Analysis must be completed within 14 days of collection if stored at 4 degrees Centigrade. Can hold for 18 months if sample is frozen.
EPA 548 (Endothall)	Collect 250 ml of water in amber glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 7 days of collection. Analyze extract within 1 day of extraction.

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Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

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Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 549 (Diquat/Paraquat)	Collect 250 ml of water in an amber polyvinylchloride (PVC) high density bottle with a screw cap.	If biologically active, pH to 2 with sulfuric acid. If chlorinated, add 100mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 7 days of collection and complete analysis within 21 days after extraction.
EPA 550.1(Polyaromatic Hydrocarbons - PAH's)	Collect 1 liter of water in an amber glass bottle with a teflon-lined screw cap.	If chlorinated, add 100 mg sodium thiosulfate per liter of sample. Adjust to pH < 2 with 6 N HCl. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 7 days of collection and analyxe within 30 days after extraction.

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 551 (Disinfection Byproducts)	Collect two 40-ml teflon-lined septum screw cap/site. Do not allow air bubbles to be trapped in the sample.	pH = 4.5 to 5.0 with 0.1-0.2 N HCl. If the samples are chlorinated, add 4 mg of ammonium chloride/40 ml vial. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. It is important that the sample pH is not adjusted until the ammonium chloride has been added to the sample and fully dissolved. pH below 4.2 will destoy many of the analytes. If chloral hydrate is to be analyzed, a separate sample must be collected. The sample for chloral hydrate should be dechlorinated with 4 mg of sodium sulfite or 25 mg of ascorbic acid instead of ammonium chloride.	Complete analysis within 14 days of collection.
EPA 552 (Haloacetic Acids)	Collect 100 ml water in a 120-ml amber glass bottle with a teflon-lined screw cap.	If the samples are chlorinated, add 25 mg of ammonium chloride/250 ml vial. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 28 days of collection and complete analysis within 30 days of collection. Protect from light.
EPA 553 (Benzidines + Nitrogen Pesticides)	Collect 1 liter of water in an amber glass bottle with a teflon-lined screw cap.	If chlorinated, add 40 to 50 mg sodium thiosulfate per liter of sample. Keep at 4 degrees centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light.	Extract within 7 days of collection and complete analysis within 30 days of collection.

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 554 (Carbonyl Compounds)	Collect 250 ml of water in an amber glass bottle with a teflon-lined screw cap.	If chlorinated, add 25 mg ammonium chloride per 250 ml water sample. Keep at 4 degrees centigrade from the time of collection until analysis. Ship overnight on ice.	Samples must be derivitized and extracted within 3 days of collection.
EPA 555 (Phenoxy Herbicides Chlorinated Acids)	Collect 125 ml of water in an amber glass bottle with a teflon-lined screw cap.	Add 1:1 concentrated HCl:water to pH 2. If chlorinated, add 4-5 mg sodium sulfite per 100 ml sample. Keep at 4 degrees centigrade from the time of collection until analysis. Ship overnight on ice. Protect from light.	Analyze within 14 days of collection.
EPA 1613 (TCDD / Dioxins / Furans)	1 Liter amber bottle w/Teflon lined screw cap. Cool to 4° C.	Add 80 mg sodium thiosulfate if sample contains residual chlorine. Chill to 0°C-4°C and maintain at that temperature in the dark until analysis.	None
EPA 600/4-83-043 Asbestos	1 Liter plastic cubitainer.	None	48 Hours
NY APC-44 (Ethylene Glycol)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH <2 with 1 + 1 HCL (approximately 1ml per liter of water). Ship on ice by overnight express.	Analyze as soon as possible after collection.

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

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Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

Safe Drinking Water Act (SDWA)

MDL/MCL Table

METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μG/L)
EPA 110.2	Color	COLOR	5 UNITS	
EPA 120.1	Specific Conductance	SPCON	0.9 μMHOS	
EPA 200.7 - ICP	Aluminum - Al	7429-90-5	20	50
EPA 200.7 - ICP	Antimony - Sb	7440-36-0	* 8	* 6
EPA 200.7 - ICP	Arsenic - As	7440-38-2	8	50
EPA 200.7 - ICP	Barium - Ba	7440-39-3	1	2000
EPA 200.7 - ICP	Beryllium - Be	7440-41-7	0.3	4
EPA 200.7 - ICP	Boron - B	7440-42-8	3	
EPA 200.7 - ICP	Cadmium - Cd	7440-43-9	* 10	* 5
EPA 200.7 - ICP	Calcium - Ca	7440-70-2	10	
EPA 200.7 - ICP	Chromium - Cr	7440-47-3	4	100
EPA 200.7 - ICP	Cobalt - Co	7440-48-4	2	
EPA 200.7 - ICP	Copper - Cu	7440-50-8	3	1300 Note 5
EPA 200.7 - ICP	Iron - Fe	7439-89-6	30	300
EPA 200.7 - ICP	Lead - Pb	7439-92-1	* 10	* 15 Note 5
EPA 200.7 - ICP	Lithium - Li	7439-93-1	1	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 200.7 - ICP	Magnesium - Mg	7439-95-4	20	
EPA 200.7 - ICP	Manganese - Mn	7439-96-5	1	50
EPA 200.7 - ICP	Molydenum - Mo	7439-98-7	4	
EPA 200.7 - ICP	Nickel - Ni	7440-02-0	5	
EPA 200.7 - ICP	Potassium - K	7440-09-7	300	
EPA 200.7 - ICP	Selenium - Se	7782-49-2	20	50
EPA 200.7 - ICP	Silver - Ag	7440-22-4	2	100
EPA 200.7 - ICP	Sodium - Na	7440-23-5	30	20,000
EPA 200.7 - ICP	Strontium - Sr	7440-24-6	0.3	
EPA 200.7 - ICP	Thallium - Tl	7440-28-0	* 20	* 2
EPA 200.7 - ICP	Tin - Sn	7440-31-5	7	
EPA 200.7 - ICP	Vanadium - V	7440-62-2	3	
EPA 200.7 - ICP	Zinc - Zn	7440-66-6	2	5000
EPA 200.8 ICP-MS	Aluminum - Al	7429-90-5	1	50
EPA 200.8 ICP-MS	Antimony - Sb	7440-36-0	0.4	6
EPA 200.8 ICP-MS	Arsenic - As	7440-38-2	1.4	50
EPA 200.8 ICP-MS	Barium - Ba	7440-39-3	0.8	2000

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Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 200.8 ICP-MS	Beryllium - Be	7440-41-7	0.3	4
EPA 200.8 ICP-MS	Cadmium - Cd	7440-43-9	0.5	5
EPA 200.8 ICP-MS	Chromium - Cr	7440-47-3	0.9	100
EPA 200.8 ICP-MS	Cobalt - Co	7440-48-4	0.09	
EPA 200.8 ICP-MS	Copper - Cu	7440-50-8	0.5	1300 Note 5
EPA 200.8 ICP-MS	Lead - Pb	7439-92-1	0.6	15 Note 5
EPA 200.8 ICP-MS	Manganese - Mn	7439-96-5	0.1	50
EPA 200.8 ICP-MS	Molydenum - Mo	7439-98-7	0.3	
EPA 200.8 ICP-MS	Nickel - Ni	7440-02-0	0.5	
EPA 200.8 ICP-MS	Selenium - Se	7782-49-2	7.9	50
EPA 200.8 ICP-MS	Silver - Ag	7440-22-4	0.1	100
EPA 200.8 ICP-MS	Thallium - Tl	7440-28-0	0.3	2

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µG/L)**	**USEPA MCL (µG/L)**
EPA 200.8 ICP-MS	Vanadium - V	7440-62-2	2.5	
EPA 200.8 ICP-MS	Zinc - Zn	7440-66-6	1.8	5000
EPA 200.9 - Furnace	Aluminum - Al	7429-90-5	0.5	50
EPA 200.9 - Furnace	Antimony - Sb	7440-36-0	0.8	6
EPA 200.9 - Furnace	Cadmium - Cd	7440-43-9	0.05	5
EPA 200.9 - Furnace	Chromium - Cr	7440-47-3	0.1	100
EPA 200.9 - Furnace	Copper - Cu	7440-50-8	0.7	1300[Note 5]
EPA 200.9 - Furnace	Iron - Fe	7439-89-6	ND	300
EPA 200.9 - Furnace	Lead - Pb	7439-92-1	0.7	15[Note 5]
EPA 200.9 - Furnace	Manganese - Mn	7439-96-5	0.3	50
EPA 200.9 - Furnace	Nickel - Ni	7440-02-0	0.6	
EPA 200.9 - Furnace	Silver - Ag	7440-22-4	0.5	100

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 200.9 - Furnace	Tin - Sn	7440-31-5	1.7	
EPA 200.9 - Furnace	Zinc - Zn	7440-66-6	0.3	5000
EPA 202.1 - Flame	Aluminum - Al	7429-90-5	1	50
EPA 204.2 - Flame	Antimony - Sb	7440-36-0	* 70	* 6
EPA 206.2 - Furnace	Arsenic - As	7440-38-2	0.5	50
EPA 208.1 - Flame	Barium - Ba	7440-39-3	4	2000
EPA 210.1 - Flame	Beryllium - Be	7440-41-7	* 30	* 4
EPA 210.2 - Furnace	Beryllium - Be	7440-41-7	0.02	4
EPA 213.1 - Flame	Cadmium - Cd	7440-43-9	* 25	* 5
EPA 215.1 - Flame	Calcium - Ca	7440-70-2	100	
EPA 218.1 - Flame	Chromium - Cr	7440-47-3	10	100
EPA 218.6 - Color	Chromium VI - Cr^{+6}(Hexavalent)	744047H	0.3	
EPA 219.1 - Flame	Cobalt - Co	7440-48-4	200	
EPA 220.1 - Flame	Copper - Cu	7440-50-8	10	1300^Note 5
EPA 236.1 - Flame	Iron - Fe	7439-89-6	10	300
EPA 239.1 - Flame	Lead - Pb	7439-92-1	* 50	* 15^Note 5
EPA 242.1 - Flame	Magnesium - Mg	7439-95-4	0.5	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 243.1 - Flame	Manganese - Mn	7439-96-5	10	50
EPA 245.1 Cold vapor	Mercury - Hg	7439-97-6	0.2	
EPA 249.1 - Flame	Nickel - Ni	7440-02-0	20	
EPA 258.1 - Flame	Potassium - K	7440-09-7	40	
EPA 270.2 - Furnace	Selenium - Se	7782-49-2	0.6	50
EPA 272.1 - Flame	Silver - Ag	7440-22-4	10	100
EPA 273.1 - Flame	Sodium - Na	7440-23-5	10	20,000
EPA 279.2 - Furnace	Thallium - Tl	7440-28-0	0.7	2
EPA 289.1 - Flame	Zinc - Zn	7440-66-6	5	5000
EPA 300.0	Bromide	2495967	1	
EPA 300.0	Sulfate	1480879	1	400/500 Proposed
EPA 305.1	Acidity, Total	ACIDT	1	
EPA 310.1	Alkalinity, Bicarbonate	ALKB	1	
EPA 310.1	Alkalinity, Total	ALKT	1	
EPA 325.2	Chloride	168870	1	
EPA 335.3	Cyanide, Total	57125T	0.005	200
EPA 335.3	Cyanide, Free	57125F	0.005	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μG/L)
EPA 340.2	Fluoride	16984488	0.1	4000
EPA 350.1	Ammonia (Nitrogen)	7664417	0.2	
EPA 351.2	Kjeldahl Nitrogen	7727379	0.2	
EPA 353.2	Nitrate (as Nitrogen)	1479755	0.1	10,000
EPA 353.2	Nitrite (as Nitrogen)	1479765	0.02	1000
EPA 365.1	Orthophosphate	1426544	0.10	
EPA 365.1	Phosphorus, Total	7723140	0.10	
EPA 370.1	Silica	14808607	1	
EPA 376.1	Sulfide	1849625	0.1	
EPA 501.1	Bromodichloromethane	75274	0.5	Note 6 TTHM 100
EPA 501.1	Bromoform	75252	0.5	Note 6 TTHM 100
EPA 501.1	Chlorodibromomethane	124481	0.5	Note 6 TTHM 100
EPA 501.1	Chloroform	67663	0.5	Note 6 TTHM 100
EPA 501.1	Total THM	T'THM	0.5	
EPA 502.1	1,1- Dichloroethane	75343	0.5	
EPA 502.1	1,1- Dichloropropene	563586	0.5	
EPA 502.1	1,1- Dichloroethene	75354	0.5	
EPA 502.1	1,1,1- Trichloroethane	71556	0.5	200
EPA 502.1	1,1,1,2- Tetrachloroethane	630206	0.5	
EPA 502.1	1,1,2- Trichloroethane	79005	0.5	5

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 502.1	1,1,2,2- Tetrachloroethane	79345	0.5	
EPA 502.1	1,2- Dichloroethane	107062	0.5	5
EPA 502.1	1,2- Dichlorobenzene	95501	0.5	600
EPA 502.1	1,2-Dibromomethane	106934	0.5	
EPA 502.1	1,2-Dichloropropane	78875	0.5	5
EPA 502.1	1,2,3- Trichloropropane	96184	0.5	
EPA 502.1	1,3- Dichloropropane	142289	0.5	
EPA 502.1	1,3- Dichlorobenzene	541731	0.5	
EPA 502.1	1,4- Dichlorobenzene	106467	0.5	75
EPA 502.1	2- Chlorotoluene	95498	0.5	
EPA 502.1	2,2- Dichloropropane	590207	0.5	
EPA 502.1	4- Chlorotoluene	106434	0.5	
EPA 502.1	Bromobenzene	108861	0.5	
EPA 502.1	Bromochloromethane	74975	0.5	
EPA 502.1	Bromodichloromethane	75274	0.5	Note 6 TTHM 100
EPA 502.1	Bromoform	75252	0.5	Note6 TTHM 100
EPA 502.1	Bromomethane	74839	0.5	
EPA 502.1	Carbon Tetrachloride	56235	0.5	5
EPA 502.1	Chlorobenzene	108907	0.5	100
EPA 502.1	Chlorodibromomethane	124481	0.5	Note 6 TTHM 100

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μG/L)
EPA 502.1	Chloroethane	175003	0.5	
EPA 502.1	Chloroform	67663	0.5	Note 6 TTHM 100
EPA 502.1	Chloromethane	74873	0.5	
EPA 502.1	cis-1,2- Dichloroethene	156594	0.5	70
EPA 502.1	cis-1,3- Dichloropropene	10061015	0.5	
EPA 502.1	Dibromomethane	74953	0.5	
EPA 502.1	Dichlorodifluoromethane	75718	0.5	
EPA 502.1	Methylene chloride	75092	0.5	
EPA 502.1	Tetrachloroethene	127184	0.5	
EPA 502.1	trans-1,2- Dichloroethene	156605	0.5	100
EPA 502.1	trans-1,3- Dichloropropene	10061026	0.5	
EPA 502.1	Trichloroethylene	79016	0.5	5
EPA 502.1	Trichlorofluoromethane	75694	0.5	
EPA 502.1	Vinyl chloride	75014	0.5	2
EPA 502.2	1,1- Dichloropropene	563586	0.5	
EPA 502.2	1,1- Dichloroethene	75354	0.5	
EPA 502.2	1,1- Dichloroethane	75343	0.5	
EPA 502.2	1,1,1- Trichloroethane	71556	0.5	200
EPA 502.2	1,1,1,2- Tetrachloroethane	100425	0.5	
EPA 502.2	1,1,2- Trichloroethane	79005	0.5	5

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 502.2	1,1,2,2- Tetrachloroethane	630206	0.5	
EPA 502.2	1,2- Dichlorobenzene	95501	0.5	600
EPA 502.2	1,2- Dichloropropane	78875	0.5	5
EPA 502.2	1,2- Dichloroethane	107062	0.5	5
EPA 502.2	1,2-Dibromomethane	106934	0.5	
EPA 502.2	1,2,3- Trichlorobenzene	87616	0.5	
EPA 502.2	1,2,3- Trichloropropane	96184	0.5	
EPA 502.2	1,2,4- Trichlorobenzene	120821	0.5	70
EPA 502.2	1,2,4- Trimethylbenzene	95636	0.5	
EPA 502.2	1,3- Dichlorobenzene	541731	0.5	
EPA 502.2	1,3- Dichloropropane	142289	0.5	
EPA 502.2	1,3,5- Trichlorobenzene	108703	0.5	
EPA 502.2	1,3,5- Trimethylbenzene	108678	0.5	
EPA 502.2	1,4- Dichlorobenzene	106467	0.5	75
EPA 502.2	2- Chlorotoluene	95498	0.5	
EPA 502.2	2,2- Dichloropropane	590207	0.5	
EPA 502.2	4- Chlorotoluene	106434	0.5	
EPA 502.2	4- Isopropyltoluene	99876	0.5	
EPA 502.2	Benzene	71432	0.5	5
EPA 502.2	Bromobenzene	108861	0.5	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level [illegible]
Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 502.2	Bromochloromethane	74975	0.5	
EPA 502.2	Bromodichloromethane	75274	0.5	Note 6 TTHM 100
EPA 502.2	Bromoform	75252	0.5	Note 6 TTHM 100
EPA 502.2	Bromomethane	748395	0.5	
EPA 502.2	Carbon Tetrachloride	56235	0.5	5
EPA 502.2	Chlorobenzene	108907	0.5	100
EPA 502.2	Chlorodibromomethane	124481	0.5	Note 6 TTHM 100
EPA 502.2	Chloroform	67663	0.5	Note 6 TTHM 100
EPA 502.2	Chloromethane	74873	0.5	
EPA 502.2	cis-1,2- Dichloroethene	156594	0.5	70
EPA 502.2	cis-1,3- Dichloropropene	10061015	0.5	
EPA 502.2	DBCP	96128	* 0.5	* 0.2
EPA 502.2	Dibromomethane	74953	0.5	
EPA 502.2	Dichlorodifluoromethane	75718	0.5	
EPA 502.2	EDB	106934	* 0.5	* 0.05
EPA 502.2	Ethyl Benzene	100414	0.5	700
EPA 502.2	Hexachlorobutadiene	87683	0.5	
EPA 502.2	Isopropylbenzene	98828	0.5	
EPA 502.2	m- Xylene	108383	0.5	Total 10,000
EPA 502.2	n- Butylbenzene	104518	0.5	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 502.2	n- Propylbenzene	91203	0.5	
EPA 502.2	Naphthalene	75092	0.5	
EPA 502.2	o- Xylene	95476	0.5	Total 10,000
EPA 502.2	p- Xylene	106423	0.5	Total 10,000
EPA 502.2	sec- Butylbenzene	135988	0.5	
EPA 502.2	Styrene	103651	0.5	100
EPA 502.2	tert- Butylbenzene	98066	0.5	
EPA 502.2	Tetrachloroethene	79345	0.5	
EPA 502.2	Toluene	108883	0.5	1000
EPA 502.2	trans-1,2- Dichloroethene	156605	0.5	100
EPA 502.2	trans-1,3- Dichloropropene	10061026	0.5	
EPA 502.2	Trichloroethylene	79016	0.5	5
EPA 502.2	Trichlorofluoromethane	75694	0.5	
EPA 502.2	Vinyl chloride	75014	0.5	2
EPA 503.1	1,2- Dichlorobenzene	95501	0.5	600
EPA 503.1	1,2,3- Trichlorobenzene	87616	0.5	
EPA 503.1	1,2,4- Trimethylbenzene	95636	0.5	
EPA 503.1	1,2,4- Trichlorobenzene	120821	0.5	70
EPA 503.1	1,3- Dichlorobenzene	541731	0.5	
EPA 503.1	1,3,5- Trimethylbenzene	108678	0.5	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 503.1	1,4- Dichlorobenzene	106467	0.5	75
EPA 503.1	2- Chlorotoluene	95498	0.5	
EPA 503.1	4- Isopropyltoluene	99876	0.5	
EPA 503.1	4- Chlorotoluene	106434	0.5	
EPA 503.1	Benzene	71432	0.5	5
EPA 503.1	Bromobenzene	108861	0.5	
EPA 503.1	Chlorobenzene	108907	0.5	100
EPA 503.1	DBCP	96128	0.5	0.2
EPA 503.1	Ethyl Benzene	100414	0.5	700
EPA 503.1	Hexachlorobutadiene	87683	0.5	
EPA 503.1	Isopropylbenzene	98828	0.5	
EPA 503.1	m- Xylene	108383	0.5	Total 10,000
EPA 503.1	n- Butylbenzene	104518	0.5	
EPA 503.1	n- Propylbenzene	91203	0.5	
EPA 503.1	Naphthalene	75092	0.5	
EPA 503.1	o- Xylene	95476	0.5	Total 10,000
EPA 503.1	p- Xylene	106423	0.5	Total 10,000
EPA 503.1	sec- Butylbenzene	135988	0.5	
EPA 503.1	Styrene	103651	0.5	100
EPA 503.1	tert- Butylbenzene	98066	0.5	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 503.1	Tetrachloroethene	79345	0.5	
EPA 503.1	Toluene	108883	0.5	1000
EPA 503.1	Trichloroethylene	79016	0.5	5
EPA 504	1,2-Dibromo-3-chloropropane (DBCP)	96128	0.01	0.20
EPA 504	Ethylene dibromide (EDB)	106934	0.01	0.05
EPA 505	Aldrin	309002	0.007	
EPA 505	Aroclor 1248 (a PCB)	12672296	0.102	
EPA 505	Aroclor 1232 (a PCB)	11141165	0.48	
EPA 505	Aroclor 1254 (a PCB)	11097691	0.102	
EPA 505	Aroclor 1242 (a PCB)	53469219	0.31	
EPA 505	Aroclor 1260 (a PCB)	11096825	0.189	
EPA 505	Aroclor 1221 (a PCB)	11104282	15.	
EPA 505	Aroclor 1016 (a PCB)	12674112	0.08	
EPA 505	Chlordane	57749	0.14	2.0
EPA 505	Dieldrin	60571	0.012	
EPA 505	Endrin	72208	0.063	2.0
EPA 505	Heptachlor Epoxide	1024573	0.004	0.20
EPA 505	Heptachlor	76448	0.003	0.40
EPA 505	Hexachlorobenzene	118741	0.002	1.0
EPA 505	Hexachlorocyclopentadiene	77744	0.13	50

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 505	Lindane	58899	0.003	0.20
EPA 505	Methoxychlor	72435	0.96	40
EPA 505	Toxaphene	8001352	1	3.0
EPA 506	Bis(2-ethylhexyl) phthalate (DEHP)	117817	2.25	6.0
EPA 506	Bis(2-ethylhexyl) adipate	103231	11.82	400
EPA 506	Butylbenzyl phthalate	85687	2.67	
EPA 506	Di-n-octyl phthalate	117840	6.42	
EPA 506	Di-n-butyl phthalate	84722	1.23	
EPA 506	Diethyl phthalate	84662	0.84	
EPA 506	Dimethyl phthalate	131113	1.14	
EPA 507	Alachlor	15972608	0.38	2.0
EPA 507	Ametryn	834128	2	
EPA 507	Atraton	1610179	0.6	
EPA 507	Atrazine	1912249	0.13	3.0
EPA 507	Bromacil	314409	2.5	
EPA 507	Butachlor	23184669	0.38	
EPA 507	Butylate	2008415	0.15	
EPA 507	Carboxin	5234685	0.6	
EPA 507	Chlorpropham	101213	0.5	
EPA 507	Cycloate	1134232	0.25	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 507	Diazinon	333415	0.25	
EPA 507	Dichlorvos	62737	2.5	
EPA 507	Diphenamid	957517	0.6	
EPA 507	Disulfoton sulfoxide	2497076	0.38	
EPA 507	Disulfoton sulfone	2497065	3.8	
EPA 507	Disulfoton	298044	0.3	
EPA 507	Diuron*	330541	4.4	
EPA 507	EPTC	759944	0.25	
EPA 507	Ethoprop	13194484	0.19	
EPA 507	Fenamiphos	22224926	1	
EPA 507	Fenarimol	60168889	0.38	
EPA 507	Fluridone	59756604	3.8	
EPA 507	Hexazinone	51235042	0.76	
EPA 507	Merphos	150505	0.25	
EPA 507	Methyl paraoxon	950356	2.5	
EPA 507	Metolachlor	51218452	0.75	
EPA 507	Metribuzin	21087649	0.15	
EPA 507	Mevinphos	7786347	5	
EPA 507	MGK 264	113484	0.5	
EPA 507	Molinate	2212671	0.15	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 507	Napropamide	15299997	0.25	
EPA 507	Norflurazon	27314132	0.5	
EPA 507	Pebulate	1114712	0.13	
EPA 507	Prometon	1610180	0.3	
EPA 507	Prometryn	7287196	0.19	
EPA 507	Pronamide	23950585	0.76	
EPA 507	Propazine	139402	0.13	
EPA 507	Simazine	122349	0.075	4.0
EPA 507	Simetryn	1014706	0.25	
EPA 507	Stirofos	22248799	0.76	
EPA 507	Tebuthiuron	34014181	1.3	
EPA 507	Terbacil	5902512	4.5	
EPA 507	Terbufos	13071799	0.5	
EPA 507	Terbutryn	886500	0.25	
EPA 507	Thiobencarb*	28249776	ND	
EPA 507	Triademefon	43121433	0.65	
EPA 507	Tricyclazole	41814782	1	
EPA 507	Vernolate	1929777	0.13	
EPA 508	4,4'-DDE	72559	0.01	
EPA 508	4,4'-DDD	72548	0.0025	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 508	4,4'-DDT	50293	0.06	
EPA 508	Aldrin	309002	0.075	
EPA 508	alpha-BHC	319846	0.025	
EPA 508	Aroclor 1221	11104282	ND	
EPA 508	Aroclor 1232	11141165	ND	
EPA 508	Aroclor 1016	12674112	ND	
EPA 508	Aroclor 1242	53469219	ND	
EPA 508	Aroclor 1254	11097691	ND	
EPA 508	Aroclor 1248	12672296	ND	
EPA 508	Aroclor 1260	11096825	ND	
EPA 508	beta-BHC	319857	0.01	
EPA 508	Chlordane	57749	ND	2.0
EPA 508	Chlordane	57749	ND	
EPA 508	Chlorneb	2675776	0.5	
EPA 508	Chloroenzilate	501156	5	
EPA 508	Chlorothalonil	2921882	0.025	
EPA 508	cis-Permethrin	54774457	0.5	
EPA 508	DCPA	1897456	0.025	
EPA 508	delta-BHC	319868	0.01	
EPA 508	Dieldrin	60571	0.02	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 508	Endosulfan I	959988	0.015	
EPA 508	Endosulfan sulfate	1031078	0.015	
EPA 508	Endosulfan II	33213659	0.024	
EPA 508	Endrin aldehyde	7421934	0.025	
EPA 508	Endrin	72208	0.015	2.0
EPA 508	Etridiazole	2593159	0.025	
EPA 508	Heptachlor Epoxide	1024573	0.015	0.20
EPA 508	Heptachlor	76448	0.01	0.40
EPA 508	Hexachlorobenzene	118741	0.0077	1.0
EPA 508	Lindane (gamma-BHC)	58899	0.015	0.20
EPA 508	Methoxychlor	72435	0.05	40
EPA 508A	PCBs as Decachlorobiphenyl Must collect a second sample for either EPA 505 or 508.	10CL2PH	0.5	0.50
EPA 508	Propachlor	1918167	0.5	
EPA 508	Toxaphene	8001352	1	3.0
EPA 508	trans-Permethrin	51877748	0.5	
EPA 508	Trifluralin	1582098	0.025	
EPA 509	Ethylene thiourea (ETU)	96457	2.7	
EPA 515.1	2,4-D	94757	0.2	70
EPA 515.1	2,4-DB	94826	0.8	

*** - Where MDL > MCL - an alternate method must be selected**

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 515.1	2,4,5-T	93765	0.08	
EPA 515.1	2,4,5-TP (Silvex)	93721	0.075	50
EPA 515.1	3,5-Dichlorobenzoic zcid	51365	0.061	
EPA 515.1	4-Nitrophenol	100027	0.13	
EPA 515.1	5-Hydroxydicamba	7600502	0.04	
EPA 515.1	Acifluorfen	62476599	0.096	
EPA 515.1	Bentazon	25057890	0.2	
EPA 515.1	Chloramben	133904	0.093	
EPA 515.1	Dalapon	75990	1.3	200
EPA 515.1	DCPA acid (metabolites)	1897456	0.02	
EPA 515.1	Dicamba	1918009	0.081	
EPA 515.1	Dichlorprop	120365	0.26	
EPA 515.1	Dinoseb	88857	0.19	7.0
EPA 515.1	Pentachlorophenol (PCP)	87865	0.07	1.0
EPA 515.1	Picloram	1918021	0.14	500
EPA 525 - SV	2- Chlorobiphenol	95578	0.1	
EPA 525 - SV	2,2',3,3',4,4',6- Heptachlorobiphenyl	52663715	0.3	Total PCB 0.5
EPA 525 - SV	2,2',3,3',4,5',6,6'- Octachlorobiphenyl	40186718	0.1	Total PCB 0.5
EPA 525 - SV	2,2',4,4'- Tetrachlorobiphenyl	2437798	0.1	Total PCB 0.5
EPA 525 - SV	2,2',4,4',5,6'- Hexachlorobiphenyl	60145224	0.1	Total PCB 0.5

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Leve
Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µG/L)**	**USEPA MCL (µG/L)**
EPA 525 - SV	2,2,3,4,6- Pentachlorobiphenyl	60233252	0.1	Total PCB 0.5
EPA 525 - SV	2,3- Dichlorobiphenyl	16605917	0.2	Total PCB 0.5
EPA 525 - SV	2,4,5- Trichlorobiphenyl	15862074	0.12	Total PCB 0.5
EPA 525 - SV	4- Nitrophenol	100027	0.13	
EPA 525 - SV	Acenaphthylene	208968	0.1	
EPA 525 - SV	Alachlor	15972608	1	2.0
EPA 525 - SV	Aldrin	309002	0.1	
EPA 525 - SV	alpha-Chlordane	5103719	0.1	Total 2.0
EPA 525 - SV	Anthracene	120127	0.1	
EPA 525 - SV	Atrazine	1912249	0.3	3.0
EPA 525 - SV	Benzo(a)anthracene	56553	0.2	
EPA 525 - SV	Benzo(a)pyrene	50328	0.1	0.2
EPA 525 - SV	Benzo(b)fluoranthene	205992	0.3	
EPA 525 - SV	Benzo(g,h,i)perylene	191242	0.1	
EPA 525 - SV	Benzo(k)fluoranthene	207089	0.3	
EPA 525 - SV	Bis(2-ethylhexyl)adipate	103231	0.5	400
EPA 525 - SV	Bis(2-ethylhexyl)phthalate	117817	0.8	6.0
EPA 525 - SV	Butyl benzyl phthalate	85687	0.5	
EPA 525 - SV	Chrysene	218019	0.3	
EPA 525 - SV	Di-n- butyl phthalate	84722	4	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μG/L)
EPA 525 - SV	Dibenzo(a,h)anthracene	53703	0.1	
EPA 525 - SV	Diethyl phthalate	84662	0.6	
EPA 525 - SV	Dimethyl phthalate	131113	0.3	
EPA 525 - SV	Endrin	72208	1	2.0
EPA 525 - SV	Fluorene	86737	0.1	
EPA 525 - SV	gamma- BHC (Lindane)	58899	.1	0.2
EPA 525 - SV	gamma-Chlordane	5103742	0.3	Total 2.0
EPA 525 - SV	Heptachlor	76448	0.2	0.4
EPA 525 - SV	Heptachlor Epoxide	1024573	0.3	1.0
EPA 525 - SV	Hexachlorobenzene	118741	0.1	1.0
EPA 525 - SV	Hexachlorocyclopentadiene	77744	0.1	50
EPA 525 - SV	Indeno(1,2,3-cd)pyrene	193395	0.02	
EPA 525 - SV	Methoxychlor	72435	0.3	40
EPA 525 - SV	PCP	87865	3	1.0
EPA 525 - SV	Phenanthrene	85018	0.2	
EPA 525 - SV	Pyrene	129000	0.1	
EPA 525 - SV	Simazine	122349	0.2	4.0
EPA 525 - SV	Toxaphene	8001352	9	3.0
EPA 525 - SV	trans- Nonachlor	39765805	0.1	
EPA 531.1	3-Hydroxycarbofuran	16655826	2	

* - Where MDL > MCL an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Lev[illegible]

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 531.1	Aldicarb sulfoxide	1646873	2	4.0
EPA 531.1	Aldicarb	116063	1	3.0
EPA 531.1	Aldicarb sulfone	1646884	2	3.0
EPA 531.1	Baygon (Propoxur)	114261	1	
EPA 531.1	Carbaryl (Sevin)	63252	2	
EPA 531.1	Carbofuran	1563662	1.5	40
EPA 531.1	Methiocarb	2032657	4	
EPA 531.1	Methomyl	16752775	0.5	
EPA 531.1	Oxamyl	23135220	2	200
EPA 547	Glyphosate (N-phosphonomethyl glycine)	1071836	6	700
EPA 548	Endothall	145733	11.5	100
EPA 549	Diquat	85007	0.44	20
EPA 549	Paraquat	1910425	0.8	
EPA 550.1	Acenaphthene	83329	10	
EPA 550.1	Acenaphthylene	208968	10	
EPA 550.1	Anthracene	120127	0.625	
EPA 550.1	Benzo(a)anthracene	56553	0.01	
EPA 550.1	Benzo(a)pyrene	50328	0.05	0.20
EPA 550.1	Benzo(b)fluoranthene	205992	0.01	
EPA 550.1	Benzo(g,h,i)perylene	191242	0.05	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 550.1	Benzo(k)fluoranthene	207089	0.0125	
EPA 550.1	Chrysene	218019	0.625	
EPA 550.1	Dibenzo(a,h)anthracene	53703	0.125	
EPA 550.1	Fluoranthene	206440	0.025	
EPA 550.1	Fluorene	86737	1	
EPA 550.1	Indeno(1,2,3-cd)pyrene	193395	0.125	
EPA 550.1	Naphthalene	91203	10	
EPA 550.1	Phenanthrene	85018	0.5	
EPA 550.1	Pyrene	129000	0.625	
EPA 551	1,1-Dichloro-2-propanone	513882	0.005	
EPA 551	1,1,1-Trichloroethane	71556	0.008	
EPA 551	1,1,1-Trichloro-2-propanone	918003	0.012	
EPA 551	1,2-Dibromo-3-chloropropane (DBCP)	96128	0.009	0.20
EPA 551	1,2-Dibromoethane (EDB)	106934	0.006	0.05
EPA 551	Bromochloroacetonitrile	83463621	0.011	
EPA 551	Bromodichloromethane	75274	0.006	
EPA 551	Bromoform	75252	0.012	
EPA 551	Carbon Tetrachloride	56235	0.004	
EPA 551	Chloral hydrate	75876	0.026	
EPA 551	Chloroform	67663	0.002	

* - Where MDL > MCL - an alternate method must be selected
Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated [illegible]um of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 551	Chloropicrin	76062	0.012	
EPA 551	Dibromoacetonitrile	3252435	0.034	
EPA 551	Dibromochloromethane	124481	0.012	
EPA 551	Dichloroacetonitrile	3252435	0.019	
EPA 551	Tetrachloroethylene	127184	0.004	
EPA 551	Trichloroacetonitrile	545062	0.092	
EPA 551	Trichloroethylene	79016	0.002	
EPA 552	2-Chlorophenol	95578	0.14	
EPA 552	2,4-Dichlorophenol	120832	0.32	
EPA 552	2,4,6-Trichlorophenol	88062	0.022	
EPA 552	Bromochloroacetic acid	5589963	0.14	
EPA 552	Dibromoacetic acid	631641	0.015	
EPA 552	Dichloroacetic acid	79436	0.015	
EPA 552	Monobromoacetic acid	79083	0.0074	
EPA 552	Monochloroacetic acid	79118	0.052	
EPA 552	Trichloroacetic acid	76039	0.085	
EPA 553	3,3'-Dichlorobenzidine	91941	2.4	
EPA 553	3,3'-Dimethylbenzidine	612828	3.3	
EPA 553	3,3'-Dimethoxybenzidine	119904	7.7	
EPA 553	Benzidine	92875	2.5	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Level

Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 553	Benzoylprop ethyl	33878501	3.7	
EPA 553	Caffeine	58082	3.1	
EPA 553	Carbaryl	63252	9.8	
EPA 553	Diuron	330541	4.4	
EPA 553	Ethylene Thiourea	96457	ND	
EPA 553	Linuron	330552	13.1	
EPA 553	Monuron	150685	4	
EPA 553	o-Chlorophenyl thiourea	5344821	7.4	
EPA 553	Rotenone	83794	31.6	
EPA 553	Siduron	1982496	4.7	
EPA 554	Acetaldehyde	75070	69	
EPA 554	Butanal	123728	8.6	
EPA 554	Crotonaldehyde	123739	6.3	
EPA 554	Cyclohexanone	108941	9.5	
EPA 554	Decanal	112312	12.9	
EPA 554	Formaldehyde	50000	8.1	
EPA 554	Heptanal	111717	7.3	
EPA 554	Hexanal	66251	9.6	
EPA 554	Nonanal	124196	24.3	
EPA 554	Octanal	124130	6	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.

Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.

Note 3: SM = Standard Methods

Note 4: P =Polyethylene, G =Glass

Note 5: Action Leve[illegible]

Note 6: Regulated [illegible]m of All 4 Trihalomethanes (TTHM)

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µG/L)
EPA 554	Pentanal	110623	3.3	
EPA 554	Propanal	123386	3.4	
EPA 555	2,4-D	94757	1.3	70
EPA 555	2,4-DB	94826	1.9	
EPA 555	2,4,5-T	93765	1.3	
EPA 555	2,4,5-TP (Silvex)	93721	1.8	50
EPA 555	3,5-Dichlorobenzoic acid	51365	2.1	
EPA 555	4-Nitrophenol	100027	1.2	
EPA 555	5-Hydroxydicamba	7600502	2.2	
EPA 555	Acifluorfen	62476599	1.7	
EPA 555	Bentazon	25057890	4.6	
EPA 555	Chloramben	133904	3.1	
EPA 555	Dicamba	19188009	2.1	
EPA 555	Dichlorprop	120365	1.7	
EPA 555	Dinoseb	88857	1.5	7.0
EPA 555	MCPA	94746	0.8	
EPA 555	MCPP	93652	1.7	
EPA 555	Pentachlorophenol (PCP)	87865	1.6	1.0
EPA 555	Picloram	1918021	0.5	500
NY APC-44	Total Glycols	GLYCOLT	50	

* - Where MDL > MCL - an alternate method must be selected

Note 1: Exactly 250 ml sample if for Lead Assessment Program (LAP) and/or Lead and Copper Program. Preserve with 5 ml of 1:1 Nitric Acid : Distilled Water.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8 or 200.9.
Note 3: SM = Standard Methods
Note 4: P =Polyethylene, G =Glass
Note 5: Action Level
Note 6: Regulated as Sum of All 4 Trihalomethanes (TTHM)

Abbreviations	
a	In addition, MCL and MCLG for total nitrate and nitrite is 10 mg/L measured as nitrogen.
MCL	Maximum contaminant level
mg/L	Milligrams per liter
NPDWR	National Primary Drinking Water Regulations
NSDWR	National Secondary Drinking Water Regulations
MDL	Maximum detection level
PM	Promulgated criterion
SDWA	Safe Drinking Water Act
SMCL	Secondiary maximum contaminant level
μg/L	Micrograms per Liter
TDS	Total dissolved solids

Clean Water Act (CWA) (NPDES/SPDES)

Collection Table

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 110.2 Color	1 Liter P,G	Cool to 4° C	48 Hours
EPA 120.1 Specific Conductance	1 Liter P,G	Cool to 4° C	28 Days
EPA 130 Hardness	N/A	Calculated from Calcium, Magnesium.	N/A
EPA 140.1 Odor	1 Liter P,G	Done on Site	Immediately - Field Test
EPA 150.1 pH	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 160.1 Residue Filterable (TDS)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.2 Residue Nonfilterable (TSS)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.3 Residue Total	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.4 Residue Volatile (Total)	1 Liter P,G	Cool to 4° C	7 Days
EPA 160.5 Residue Settleable	1 Liter P,G	Cool to 4° C	48 Hours

Note 1: MCL will vary from state to state and depend on NPDES requirements set by the state. Write your states permit requirements in this column.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8.
Note 3: (NP) Not Promulgated.
Note 4: SM = Standard Methods.
Note 5: P = Polyethylene and G = glass

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 170.1 Temperature	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 180.1 Turbidity	1 Liter P,G	Cool to 4° C	48 Hours
EPA 200.7 Boron	1 Liter, plastic Only	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.7 ICP Screen	1 Liter, plastic or glass, See Note 2.	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.8 ICP-MS Screen	1 Liter, plastic or glass, See Note 2.	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 200.9 Graphite Furnace	1 Liter, plastic or glass, See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 202.1 Aluminum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 204.2 Antimony	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 206.2 Arsenic	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 208.1 Barium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 210.1 Beryllium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 213.1 Cadmium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 215.1 Calcium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 218.1 Chromium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 218.6 Chromium VI	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	48 Hours
EPA 219.1 Cobalt	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 220.1 Copper	1 Liter, plastic or glass, See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 236.1 Iron	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 239.1 Lead	1 Liter, plastic or glass. See Note 1	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 242.1 Magnesium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 243.1 Manganese	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 245.1 Mercury	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	28 Days
EPA 249.1 Nickel	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 258.1 Potassium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 270.2 Selenium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 272.1 Silver	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 273.1 Sodium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 279.2 Thallium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 289.1 Zinc	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 300.0 Iodide	1 Liter P,G	Cool to 4° C	24 Hours
EPA 300.0 Bromide	1 Liter P,G	Cool to 4° C	28 Days
EPA 305.1 Acidity	1 Liter P,G	Cool to 4° C	14 Days
EPA 310.1 Alkalinity	1 Liter P,G	Cool to 4° C	14 Days
EPA 325.2 Chloride	1 Liter P,G	Cool to 4° C	28 Days
EPA 330 Chlorine	1 Liter P,G	Done on Site	Immediately - Feild Test
EPA 335.3 Cyanide: Total Amenable to Chlorination	1 Liter P,G	Cool to 4° C, Sodium Hydroxide to pH>12, Add 100 mg/Liter Sodium Thiosulfate if chlorine or sulfide is present.	14 Days
EPA 340.2 Fluoride	1 Liter P	None	28 Days
EPA 350.1 Ammonia	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 351.2 Kjeldahl, Total	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 353.2 Nitrate + Nitrite	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 353.2 Nitrite	1 Liter P,G	Cool to 4° C	48 Hours
EPA 353.2 Nitrate	1 Liter P,G	Cool to 4° C	48 Hours
EPA 360 Dissolved Oxygen	1 Liter G		Immediately - Field Test
EPA 365.1 Phosphates - Total	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 365.1 Phosphates - Ortho	1 Liter G	Cool to 4° C	48 Hours
EPA 370.1 Silica	1 Liter P	Cool to 4° C	28 Days
EPA 375.2 Sulfate EPA 300.0	1 Liter P,G	Cool to 4° C	28 Days
EPA 376.1 Sulfide	1 Liter P,G	Cool to 4° C, Zinc Acetate, + Sodium Hydroxide to pH>9	7 Days
EPA 377 Sulfite	1 Liter P,G	Done on Site	Immediately - Field Test
EPA 405.1 Biological Oxygen Demand (BOD)	1 Liter P,G	Done on Site	48 Hours - Field Test

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 410.4 Total Organic Carbon (TOC)	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 413 Oil and Grease	1 Liter G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 413 Total Petroleum Hydrocarbon (TPH)	1 Liter G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 415.1 Chemical Oxygen Demand (COD)	1 Liter P,G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 420.2 Phenolics	1 Liter G	Cool to 4° C, Sulfuric Acid to pH<2	28 Days
EPA 425.1 Surfactants (MBAS)	1 Liter P,G	Cool to 4° C	48 Hours
EPA 601 (Volatile Halocarbons)	40 ml. glass with Teflon lined septum and screw cap. Collect in triplicate. Do not allow air bubbles to be trapped in sample.	If the water contains chlorine add 10 mg sodium thiosulfate per 40 ml to the sample vial before collection. Cool to 4°C.	14 days
EPA 602 (Volatile Aromatics)	40 ml. glass with Teflon lined septum and screw cap. Collect in triplicate. Do not allow air bubbles to be trapped in sample.	If the water contains chlorine add 10 mg sodium thiosulfate per 40 ml to the sample vial before collection. Also adjust sample to a pH < 2 with 1:1 HCl in water. Cool to 4°C.	14 days

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Note 3: (NP) Not Promulgated.
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 604 (Hexachloro-phene + Dichlorophen)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 604.1 (Hexachloro-phene + Dichlorophen	Collect 1 liter of water in a glass bottle with a teflon-lined screw caps.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 605	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express. Protect from light. Adjust pH to 4.0 plus or minus 0.2 with sulfuric acid.	Extract within 7 days of collection and complete analysis within 14 days of collection if stored under an inert atmosphere.
EPA 606	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 607	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Adjust to pH 7 to 10 with sodium hydroxide or sulfuric acid. Protect from light. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 608 (Organochlori ne Pesticides + PCBs)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Adjust to pH 5 to 9 with sodium hydroxide or sulfuric acid. Protect from light. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 608.1 (Organochlorine Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 608.2 (Organochlorine Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Adjust to pH 6.0 to 8.0 with sodium hydroxide or sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 609	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 610	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Protect from light. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 611	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	If chlorinated, add 80 mg sodium thiosulfate per liter. Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 612	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 614 (Organo-phosphorus Pesticides	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 615 (NP) Phenoxy-Herbicides	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 616 (C/H/O Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Adjust pH to 6.8 by adding 2 grams of monobasic sodium phosphate and 2 grams dibasic sodium phosphate per liter of sample. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 617 (Organochlori de Pesticides + PCBS)	Collect 1 liter of water in a glass bottles with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with sodium hydroxide or sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 618 (Volatile Pesticides)	Fill 25 ml bottle with teflon-lined septa cap to overflowing in such a manner that no air bubble pass through the sample as the bottle is filled. Seal the bottle so that no air bubbles are entrapped and store the bottle inverted.	Keep sample at 4 degrees Centigrade from the time of collection until analyzed. Ship overnight on ice.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 619 (Triazine Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 620 (Dipheylamin e)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 6N sodium hydroxide or 6N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection
EPA 622 (Organo-phosphorus Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 622.1 (Thiophosphate Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with sodium hydroxide or sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 624 (GC/MS Volatiles)	40 mL glass vial w/ Teflon lined screw cap. Cool to 4° C. Do not allow air bubbles to be trapped in sample.	Add sodium thiosulfate as preservative to vial prior to sampling if sample contains residual chlorine (10 mg/ mL is sufficient for up to 5 ppb chlorine). Shake for 1 min to dissolve preservative. Adjust pH to <2 w/ 1:1 HCl (about 2 drops). Chill to 4˚C and maintain at that temperature until the analysis.	14 Days
EPA 625 (GC/MS Semi-Volatiles)	1 L amber bottle w/Teflon lined screw cap. Cool to 4° C.	Add 80 mg of sodium thiosulfate if sample contains residual chlorine. Chill to 4˚C and maintain at that temperature until analysis.	7 Days
EPA 630 (Dithiocarbamate Pesticides)	Collect in a glass 40 ml vial with a teflon-lined septum screw cap. Do not allow air bubbles to be trapped in sample.	Keep at 4 degrees Centigrade from time of collection until analyzed. Add 15.2 grams of tribasic sodium phosphate per 40 ml sample to adjust the pH to 12-13. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 630.1 (Dithiocarbamate Pesticides)	Collect in a glass 40 ml vial with a teflon-lined septum screw cap. Do not allow air bubbles to be trapped in sample.	Keep at 4 degrees Centigrade from time of collection until analyzed. Add 15.2 grams of tribasic sodium phosphate per 40 ml sample to adjust the pH to 12-13. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 632 (Carbamate + Urea Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 633.1 (Organo-Nitrogen Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 6N sodium hydroxide or 6N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 634 (Thiocarbamate Pesticides)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 6N sodium hydroxide or 6N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 635 (Rotenone)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 1N sodium hydroxide or 1N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 636 (Bensulfide)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 1N sodium hydroxide or 1N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 637 (MBTS + TCMTB)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with sodium hydroxide or sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 638 (Oryzalin)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 1N sodium hydroxide or 1N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days ofcollection and complete analysis within 47 days of collection.
EPA 639 (Bendiocarb)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with 1N sodium hydroxide or 1N sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
EPA 640 (Mercaptoben zo-thiazole)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0 8.0 with sodium hydroxide or sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 102 Note 3	Collect 1 liter of water in a glassbottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 109 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH to 6.0, 8.0 with 50% sodium hydroxide or concentrated sulfuric acid. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 113 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 122 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 130 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
(NP)EPA 402 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
(NP)EPA 409 Note 3	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from the time of collection until analyzed. Ship on ice by overnight express.	Extract within 7 days of collection and complete analysis within 47 days of collection.
NY APC-44	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH <2 with 1 + 1 HCL (approximately 1ml per liter of water). Ship on ice by overnight express.	Analyze as soon as possible after collection.
SM 2330 Note 4 Langlier Index	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 2330 Note 4 Corrosivity	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 4500 Note 4 Ozone	1 Liter P,G	Cool to 4°C	N/A

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Clean Water Act (CWA) (NPDES/SPDES)

MDL Table

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 110.2	Color	COLOR	5 UNITS	
EPA 120.1	Specific Conductance	SPCON	0.9 µMHOS	
EPA 200.7 - ICP	Aluminum - Al	7429-90-5	20	
EPA 200.7 - ICP	Antimony - Sb	7440-36-0	8	
EPA 200.7 - ICP	Arsenic - As	7440-38-2	8	
EPA 200.7 - ICP	Barium - Ba	7440-39-3	1	
EPA 200.7 - ICP	Beryllium - Be	7440-41-7	0.3	
EPA 200.7 - ICP	Boron - B	7440-42-8	3	
EPA 200.7 - ICP	Cadmium - Cd	7440-43-9	10	
EPA 200.7 - ICP	Calcium - Ca	7440-70-2	10	
EPA 200.7 - ICP	Chromium - Cr	7440-47-3	4	
EPA 200.7 - ICP	Cobalt - Co	7440-48-4	2	
EPA 200.7 - ICP	Copper - Cu	7440-50-8	3	
EPA 200.7 - ICP	Iron - Fe	7439-89-6	30	
EPA 200.7 - ICP	Lead - Pb	7439-92-1	10	
EPA 200.7 - ICP	Lithium - Li	7439-93-1	1	
EPA 200.7 - ICP	Magnesium - Mg	7439-95-4	20	

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METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µG/L)**	**USEPA MCL (µg/L)**
EPA 200.7 - ICP	Manganese - Mn	7439-96-5	1	
EPA 200.7 - ICP	Molydenum - Mo	7439-98-7	4	
EPA 200.7 - ICP	Nickel - Ni	7440-02-0	5	
EPA 200.7 - ICP	Potassium - K	7440-09-7	300	
EPA 200.7 - ICP	Selenium - Se	7782-49-2	20	
EPA 200.7 - ICP	Silver - Ag	7440-22-4	2	
EPA 200.7 - ICP	Sodium - Na	7440-23-5	30	
EPA 200.7 - ICP	Strontium - Sr	7440-24-6	0.3	
EPA 200.7 - ICP	Thallium - Tl	7440-28-0	20	
EPA 200.7 - ICP	Tin - Sn	7440-31-5	7	
EPA 200.7 - ICP	Vanadium - V	7440-62-2	3	
EPA 200.7 - ICP	Zinc - Zn	7440-66-6	2	
EPA 200.8 ICP-MS	Aluminum - Al	7429-90-5	1	
EPA 200.8 ICP-MS	Antimony - Sb	7440-36-0	0.4	
EPA 200.8 ICP-MS	Arsenic - As	7440-38-2	1.4	
EPA 200.8 ICP-MS	Barium - Ba	7440-39-3	0.8	
EPA 200.8 ICP-MS	Beryllium - Be	7440-41-7	0.3	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 200.8 ICP-MS	Cadmium - Cd	7440-43-9	0.5	
EPA 200.8 ICP-MS	Chromium - Cr	7440-47-3	0.9	
EPA 200.8 ICP-MS	Cobalt - Co	7440-48-4	0.09	
EPA 200.8 ICP-MS	Copper - Cu	7440-50-8	0.5	
EPA 200.8 ICP-MS	Lead - Pb	7439-92-1	0.6	
EPA 200.8 ICP-MS	Manganese - Mn	7439-96-5	0.1	
EPA 200.8 ICP-MS	Molydenum - Mo	7439-98-7	0.3	
EPA 200.8 ICP-MS	Nickel - Ni	7440-02-0	0.5	
EPA 200.8 ICP-MS	Selenium - Se	7782-49-2	7.9	
EPA 200.8 ICP-MS	Silver - Ag	7440-22-4	0.1	
EPA 200.8 ICP-MS	Thallium - Tl	7440-28-0	0.3	
EPA 200.8 ICP-MS	Vanadium - V	7440-62-2	2.5	
EPA 200.8 ICP-MS	Zinc - Zn	7440-66-6	1.8	

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Note 4: SM = Stan[illegible] Methods.
Note 5: P = Polye[illegible]e and G = glass

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 200.9 - Furnace	Aluminum - Al	7429-90-5	0.5	
EPA 200.9 - Furnace	Antimony - Sb	7440-36-0	0.8	
EPA 200.9 - Furnace	Cadmium - Cd	7440-43-9	0.05	
EPA 200.9 - Furnace	Chromium - Cr	7440-47-3	0.1	
EPA 200.9 - Furnace	Copper - Cu	7440-50-8	0.7	
EPA 200.9 - Furnace	Iron - Fe	7439-89-6	ND	
EPA 200.9 - Furnace	Lead - Pb	7439-92-1	0.7	
EPA 200.9 - Furnace	Manganese - Mn	7439-96-5	0.3	
EPA 200.9 - Furnace	Nickel - Ni	7440-02-0	0.6	
EPA 200.9 - Furnace	Silver - Ag	7440-22-4	0.5	
EPA 200.9 - Furnace	Tin - Sn	7440-31-5	1.7	
EPA 200.9 - Furnace	Zinc - Zn	7440-66-6	0.3	
EPA 202.1 - Flame	Aluminum - Al	7429-90-5	1	
EPA 204.2 - Flame	Antimony - Sb	7440-36-0	70	
EPA 206.2 - Furnace	Arsenic - As	7440-38-2	0.5	
EPA 208.1 - Flame	Barium - Ba	7440-39-3	4	
EPA 210.1 - Flame	Beryllium - Be	7440-41-7	30	
EPA 210.2 - Furnace	Beryllium - Be	7440-41-7	0.02	
EPA 213.1 - Flame	Cadmium - Cd	7440-43-9	25	
EPA 215.1 - Flame	Calcium - Ca	7440-70-2	100	
EPA 218.1 - Flame	Chromium - Cr	7440-47-3	10	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 218.6 - Color	Chromium VI - Cr^{+6}(Hexavalent)	744047H	0.3	
EPA 219.1 - Flame	Cobalt - Co	7440-48-4	200	
EPA 220.1 - Flame	Copper - Cu	7440-50-8	10	
EPA 236.1 - Flame	Iron - Fe	7439-89-6	10	
EPA 239.1 - Flame	Lead - Pb	7439-92-1	50	
EPA 242.1 - Flame	Magnesium - Mg	7439-95-4	0.5	
EPA 243.1 - Flame	Manganese - Mn	7439-96-5	10	
EPA 245.1 Cold vapor	Mercury - Hg	7439-97-6	0.2	
EPA 249.1 - Flame	Nickel - Ni	7440-02-0	20	
EPA 258.1 - Flame	Potassium - K	7440-09-7	40	
EPA 270.2 - Furnace	Selenium - Se	7782-49-2	0.6	
EPA 272.1 - Flame	Silver - Ag	7440-22-4	10	
EPA 273.1 - Flame	Sodium - Na	7440-23-5	10	
EPA 279.2 - Furnace	Thallium - Tl	7440-28-0	0.7	
EPA 289.1 - Flame	Zinc - Zn	7440-66-6	5	
EPA 300.0	Bromide	2495967	1	
EPA 300.0	Sulfate	1480879	1	
EPA 305.1	Acidity, Total	ACIDT	1	
EPA 310.1	Alkalinity, Bicarbonate	ALKB	1	
EPA 310.1	Alkalinity, Total	ALKT	1	

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Note 4: SM = Stand[illegible] Methods.
Note 5: P = Polyet[illegible] and G = glass

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 325.2	Chloride	168870	1	
EPA 335.3	Cyanide, Total	57125T	0.005	
EPA 335.3	Cyanide, Free	57125F	0.005	
EPA 340.2	Fluoride	16984488	0.1	
EPA 350.1	Ammonia (Nitrogen)	7664417	0.2	
EPA 351.2	Kjeldahl Nitrogen	7727379	0.2	
EPA 353.2	Nitrate (as Nitrogen)	1479755	0.1	
EPA 353.2	Nitrite (as Nitrogen)	1479765	0.02	
EPA 365.1	Orthophosphate	1426544	0.10	
EPA 365.1	Phosphorus, Total	7723140	0.10	
EPA 370.1	Silica	14808607	1	
EPA 376.1	Sulfide	1849625	0.1	
EPA 600/4-81-045	Aroclor 1248 in oil	12672296		
EPA 600/4-81-045	Aroclor 1260 in oil	11096825		
EPA 600/4-81-045	Aroclor 1221 in oil	111074282		
EPA 600/4-81-045	Aroclor 1016 in oil	12674112		
EPA 600/4-81-045	Aroclor 1232 in oil	11141165		
EPA 600/4-81-045	Aroclor 1254 in oil	11097691		
EPA 600/4-81-045	Aroclor 1242 in oil	53469219		
EPA 601	1,1- Dichloroethene	75354	1	
EPA 601	1,1- Dichloroethane	75343	1	

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METHOD	CHEMICAL	CASRN	METHOD MDL (ug/L)	USEPA MCL (ug/L)
EPA 601	1,1,1- Trichloroethane	71556	1	
EPA 601	1,1,2- Trichloroethane	79005	1	
EPA 601	1,1,2,2- Tetrachloroethane	630206	1	
EPA 601	1,2- Dichlorobenzene	95501	1	
EPA 601	1,2- Dichloroethane	107062	1	
EPA 601	1,2- Dichloropropane	78875	1	
EPA 601	1,3- Dichlorobenzene	541731	1	
EPA 601	1,4- Dichlorobenzene	106467	1	
EPA 601	2-Chloroethyl vinyl ether	110758	1	
EPA 601	Bromodichloromethane	75274	1	
EPA 601	Bromoform	75252	1	
EPA 601	Bromomethane	748395	1	
EPA 601	Carbon Tetrachloride	56235	1	
EPA 601	Chlorobenzene	108907	1	
EPA 601	Chlorodibromomethane	124481	1	
EPA 601	Chloroethane	75003	1	
EPA 601	Chloroform	67663	1	
EPA 601	Chloromethane	74873	1	
EPA 601	cis-1,3- Dichloropropene	10061015	1	
EPA 601	Dichlorodifluoromethane	75718	1	
EPA 601	Methylene chloride	75092	1	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 601	Tetrachloroethene	79345	1	
EPA 601	trans-1,2- Dichloroethene	156605	1	
EPA 601	trans-1,3- Dichloropropene	10061026	1	
EPA 601	Trichloroethylene	79016	1	
EPA 601	Trichlorofluoromethane	75694	1	
EPA 601	Vinyl chloride	75014	1	
EPA 602	1,2- Dichlorobenzene	95501	1	
EPA 602	1,3- Dichlorobenzene	541731	1	
EPA 602	1,4- Dichlorobenzene	106467	1	
EPA 602	Benzene	71432	1	
EPA 602	Chlorobenzene	108907	1	
EPA 602	Ethyl Benzene	100414	1	
EPA 602	m-xylene	108383	1	
EPA 602	o-xylene	95476	1	
EPA 602	p-xylene	106423	1	
EPA 602	Toluene	108883	1	
EPA 604	2-Nitrophenol	88755	0.77	
EPA 604	2-Methyl-4,6-Dinitrophenol	534521	16.	
EPA 604	2-Chlorophenol	95578	0.58	
EPA 604	2,4-Dimethylphenol	105679	0.63	
EPA 604	2,4-Dichlorophenol	120832	0.68	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 604	2,4-Dinitrophenol	51285	13.	
EPA 604	2,4,6-Trichlorophenol	88062	0.64	
EPA 604	4-Nitrophenol	100027	2.8	
EPA 604	4-Chloro-3-methylphenol	59507	1.8	
EPA 604	Pentachlorophenol (PCP)	87865	7.4	
EPA 604	Phenol	108952	2.2	
EPA 604.1	Dichlorphen	97234	1.	
EPA 604.1	Hexachlorophene	70304	1.2	
EPA 605	3,3'-Dichlorobenzidine	91941	0.13	
EPA 605	Benzidine	92875	0.08	
EPA 606	Bis(2-ethylhexyl) phthalate (DEHP)	117817	2.	
EPA 606	Butyl benzyl phthalate	85687	0.34	
EPA 606	Di-n-butyl phthalate	84722	0.36	
EPA 606	Di-n-octylphthalate	117840	3.	
EPA 606	Diethyl phthalate	84662	0.49	
EPA 606	Dimethyl phthalate	131113	0.29	
EPA 607	N-nitrosodi-n-propylamine	621647	0.46	
EPA 607	N-nitrosodiphenylamine	86306	0.81	
EPA 607	N-nitrosodimethylamine	62759	0.15	
EPA 608	4,4'-DDT	50293	0.012	
EPA 608	4,4'-DDD	72548	0.011	

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Note 4: SM = Stand[illegible] Methods.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 608	4,4'-DDE	72559	0.004	
EPA 608	Aldrin	309002	0.1	
EPA 608	alpha-BHC	319846	0.003	
EPA 608	Aroclor 1254	11097691	ND	
EPA 608	Aroclor 1016	12674112	ND	
EPA 608	Aroclor 1260	11097691	ND	
EPA 608	Aroclor 1232	11141165	ND	
EPA 608	Aroclor 1221	11104282	ND	
EPA 608	Aroclor 1242	53469219	0.065	
EPA 608	Aroclor 1248	12672296	ND	
EPA 608	beta-BHC	319857	0.006	
EPA 608	Chlordane	57749	0.014	
EPA 608	delta-BHC	319868	0.009	
EPA 608	Dieldrin	60571	0.002	
EPA 608	Endosulfan II	33213659	0.004	
EPA 608	Endosulfan sulfate	1031078	0.066	
EPA 608	Endosulfan I	959988	0.014	
EPA 608	Endrin	72208	0.006	
EPA 608	Endrin aldehyde	7421934	0.023	
EPA 608	Heptachlor	76448	0.003	
EPA 608	Heptachlor Epoxide	1024573	0.083	

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METHOD	CHEMICAL	CASRN	METHOD MDL (uG/L)	USEPA MCL (ug/L)
EPA 608	Lindane (gamma-BHC)	58899	0.004	
EPA 608	Toxaphene	8001352	0.24	
EPA 608.1	Chlorneb	2675776	0.04	
EPA 608.1	Chlorobenzilate	501156	0.2	
EPA 608.1	Chloropropylate	5836102	0.2	
EPA 608.1	Dibromochloropropane (DBCP)	96128	0.04	
EPA 608.1	Etridazole	2593159	0.04	
EPA 608.1	PCNB (Pentachloronitrobenzene)	82688	0.06	
EPA 608.1	Propachlor	1918167	1.	
EPA 608.2	Chlorothalonil	2921882	0.001	
EPA 608.2	DCPA	1897456	0.003	
EPA 608.2	Dichloran	99309	0.002	
EPA 608.2	Methoxychlor	72435	0.04	
EPA 608.2	Permethrin	52645531	0.2	
EPA 609	2,4-Dinitrotoluene	121142	0.02	
EPA 609	2,6-Dinitrotoluene	606202	0.01	
EPA 609	Isophorone	78591	15.7	
EPA 609	Nitrobenzene	98953	13.7	
EPA 610	Acenaphthene	83329	1.8	
EPA 610	Acenaphthylene	208968	2.3	
EPA 610	Anthracene	120127	0.066	

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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 610	Benzo(a)anthracene	56553	0.013	
EPA 610	Benzo(a)pyrene	50328	0.023	
EPA 610	Benzo(b)fluoranthene	205992	0.018	
EPA 610	Benzo(g,h,i)perylene	191242	0.076	
EPA 610	Benzo(k)fluoranthene	207089	0.017	
EPA 610	Chrysene	218019	0.15	
EPA 610	Dibenzo(a,h)anthracene	53703	0.03	
EPA 610	Fluoranthene	206440	0.21	
EPA 610	Fluorene	86737	0.21	
EPA 610	Indeno(1,2,3-cd)pyrene	193395	0.043	
EPA 610	Naphthalene	91203	1.8	
EPA 610	Phenanthrene	85018	0.64	
EPA 610	Pyrene	129000	0.27	
EPA 611	4-Bromophenyl phenyl ether	101553	2.3	
EPA 611	4-Chlorophenyl phenyl ether	7005723	3.9	
EPA 611	Bis(2-chloroethoxy) methane	111911	0.5	
EPA 611	Bis(2-chloroisopropyl) ether	108601	0.8	
EPA 611	Bis(2-chloroethyl) ether	111444	0.3	
EPA 612	1,2-Dichlorobenzene	95501	1.14	
EPA 612	1,2,4-Trichlorobenzene	120821	0.05	
EPA 612	1,3-Dichlorobenzene	541731	1.19	

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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 612	1,4-Dichlorobenzene	106467	1.34	
EPA 612	2-Chloronaphthalene	91587	0.94	
EPA 612	Hexachlorobenzene	118741	0.05	
EPA 612	Hexachlorobutadiene	87683	0.34	
EPA 612	Hexachlorocyclopentadiene	77744	0.4	
EPA 612	Hexachloroethane	67721	0.030	
EPA 614	Azinophos methyl	86500	ND	
EPA 614	Demeton	8065483	ND	
EPA 614	Diazinon	333415	0.012	
EPA 614	Disulfoton	298044	ND	
EPA 614	Ethion	563122	ND	
EPA 614	Malathion	121755	ND	
EPA 614	Parathion ethyl	56382	0.015	
EPA 614	Parathion methyl	298000	0.012	
EPA 615	2,4-D	94757	1.2	
EPA 615	2,4-DB	94826	0.91	
EPA 615	2,4,5-TP (Silvex)	93721	0.17	
EPA 615	2,4,5-T	93765	0.2	
EPA 615	Dalapon	75990	5.8	
EPA 615	Dicamba	1918009	0.27	
EPA 615	Dichlorprop	120365	0.65	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 615	Dinoseb	88857	0.07	
EPA 615	MCPA	94746	249.	
EPA 615	MCPP	93652	192.	
EPA 616	Cycloprate	54460467	21.	
EPA 616	Kinoprene	42588374	18.	
EPA 616	Methoprene	40596698	22.	
EPA 616	Resmethrin	10453868	36.	
EPA 617	4,4'-DDT	50293	0.032	
EPA 617	4,4'-DDD	72548	0.012	
EPA 617	4,4'-DDE	72559	0.004	
EPA 617	Aldrin	309002	0.009	
EPA 617	alpha-BHC	319846	0.004	
EPA 617	Aroclor 1254	11097691	ND	
EPA 617	Aroclor 1242	53469219	ND	
EPA 617	Aroclor 1248	12672296	ND	
EPA 617	Aroclor 1232	11141165	ND	
EPA 617	Aroclor 1221	11104282	ND	
EPA 617	Aroclor 1016	12674112	ND	
EPA 617	Aroclor 1260	11096825	ND	
EPA 617	beta-BHC	319857	ND	
EPA 617	Captan	133062	ND	

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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 617	Carbophenthion	786196	ND	
EPA 617	Chlordane	57749	ND	
EPA 617	delta-BHC	319868	ND	
EPA 617	Dichloran	99309	ND	
EPA 617	Dicofol	115322	ND	
EPA 617	Dieldrin	60571	0.011	
EPA 617	Endosulfan I	959988	0.011	
EPA 617	Endosulfan sulfate	1031078	ND	
EPA 617	Endosulfan II	33213659	0.017	
EPA 617	Endrin	72208	ND	
EPA 617	Endrin aldehyde	7421934	ND	
EPA 617	Heptachlor Epoxide	1024573	0.003	
EPA 617	Heptachlor	76448	0.004	
EPA 617	Isodrin	465736	ND	
EPA 617	Lindane (gamma-BHC)	58899	0.002	
EPA 617	Methoxychlor	72435	0.176	
EPA 617	Mirex	2385855	0.015	
EPA 617	PCNB (Pentachloronitrobenzene)	82688	0.002	
EPA 617	Perthane	72560	ND	
EPA 617	Strobane	8001501	ND	
EPA 617	Toxaphene	8001352	ND	

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Note 3: (NP) Not Promulgated.
Note 4: SM = Standard Methods.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 617	Trifluralin	1582098	0.013	
EPA 618	Chloropicrin	76062	0.8	
EPA 618	Ethylene Dibromide	106934	0.2	
EPA 619	Ametryn	834128	0.06	
EPA 619	Atraton	1610179	ND	
EPA 619	Atrazine	1912249	0.05	
EPA 619	Prometon	1610180	0.03	
EPA 619	Prometryn	7287196	0.06	
EPA 619	Propazine	139402	0.03	
EPA 619	Secbumeton	26259450	ND	
EPA 619	Simazine	122349	0.06	
EPA 619	Simetryn	1014706	0.07	
EPA 619	Terbuthylazine	5915413	0.03	
EPA 619	Terbutryn	886500	0.05	
EPA 620	Diphenylamine	122394	1.6	
EPA 622	Azinophos methyl	86500	1.5	
EPA 622	Bolstar	35400432	0.15	
EPA 622	Chlorpyrifos methyl	5598130	0.3	
EPA 622	Chlorpyrifos (Dursban)	2921882	0.3	
EPA 622	Coumaphos	56724	1.5	
EPA 622	Demeton	8065483	0.25	

Note 1: MCL will vary from state to state and depend on NPDES requirements set by the state. Write your states permit requirements in this column.
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Note 3: (NP) Not Promulgated.
Note 4: SM = Standard Methods.
Note 5: P = Polyethylene and G = glass

METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 622	Diazinon	333415	0.6	
EPA 622	Dichlorvos	62737	0.1	
EPA 622	Disulfoton	298044	0.2	
EPA 622	Ethoprop	13194484	0.25	
EPA 622	Fensulfothion	115902	1.5	
EPA 622	Fenthion	55389	0.1	
EPA 622	Merphos	150505	0.25	
EPA 622	Mevinphos	7786347	0.3	
EPA 622	Naled	300765	0.1	
EPA 622	Parathion methyl	298000	0.3	
EPA 622	Phorate	298022	0.15	
EPA 622	Ronnel	299843	0.3	
EPA 622	Stirofos	22248799	5.	
EPA 622	Tokuthion	34643464	0.5	
EPA 622	Trichloronate	327980	0.15	
EPA 622.1	Aspon	3244904	0.6	
EPA 622.1	Dichlorofenthion	97176	0.7	
EPA 622.1	Famphur	52857	19.	
EPA 622.1	Fenitrothin	122145	2.	
EPA 622.1	Fonophos	944229	0.7	
EPA 622.1	Phosmet	732116	1.	

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METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 622.1	Thionazin	297972	1.	
EPA 625 - SV	1,2- Dichlorobenzene	95501	1.9	
EPA 625 - SV	1,2,4- Trichlorobenzene	120821	1.9	
EPA 625 - SV	1,3- Dichlorobenzene	541731	1.9	
EPA 625 - SV	1,4- Dichlorobenzene	106467	4.4	
EPA 625 - SV	2- Chloronaphthalene	91587	1.9	
EPA 625 - SV	2- Nitrophenol	88755	3.6	
EPA 625 - SV	2- Chlorophenol	95578	3.3	
EPA 625 - SV	2,4- Dimethylphenol	105679	2.7	
EPA 625 - SV	2,4- Dinitrotoluene	121142	5.7	
EPA 625 - SV	2,4- Dichlorophenol	120832	2.7	
EPA 625 - SV	2,4- Dinitrophenol	51285	42	
EPA 625 - SV	2,4,6- Trichlorophenol	88062	2.7	
EPA 625 - SV	2,6- Dinitrotoluene	606202	1.9	
EPA 625 - SV	3,3'- Dichlorobenzidine	91941	16.5	
EPA 625 - SV	4- Chloro-3-methylphenol	59507	3.	
EPA 625 - SV	4- Bromophenyl phenyl ether	101553	1.9	
EPA 625 - SV	4- Nitrophenol	100027	2.4	
EPA 625 - SV	4- Chlorophenyl phenyl ether	7005723	4.2	
EPA 625 - SV	4,4'- DDD	72548	2.8	
EPA 625 - SV	4,4'- DDT	50293	4.7	

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Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8.
Note 3: (NP) Not Promulgated.
Note 4: SM = Standard Methods.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 625 - SV	4,4'- DDE	72559	5.6	
EPA 625 - SV	4,6- Dinitro-2-methylphenol	534521	24	
EPA 625 - SV	Acenaphthene	83329	1.9	
EPA 625 - SV	Acenaphthylene	208968	3.5	
EPA 625 - SV	Aldrin	309002	1.9	
EPA 625 - SV	alpha- BHC	319846		
EPA 625 - SV	Anthracene	120127	1.9	
EPA 625 - SV	Aroclor 1254	11097691	36	
EPA 625 - SV	Aroclor 1221	11104282	30	
EPA 625 - SV	Aroclor 1016	12674112	ND	
EPA 625 - SV	Aroclor 1232	11141165	ND	
EPA 625 - SV	Aroclor 1242	53469219	ND	
EPA 625 - SV	Aroclor 1260	11096825	ND	
EPA 625 - SV	Aroclor 1248	12672296	ND	
EPA 625 - SV	Benzidine	92875	44	
EPA 625 - SV	Benzo(a)anthracene	56553	7.8	
EPA 625 - SV	Benzo(a)pyrene	50328	2.5	
EPA 625 - SV	Benzo(b)fluoranthene	205992	4.8	
EPA 625 - SV	Benzo(g,h,i)perylene	191242	4.1	
EPA 625 - SV	Benzo(k)fluoranthene	207089	2.5	
EPA 625 - SV	beta- BHC	319857	4.2	

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Note 3: (NP) Not Promulgated.
Note 4: SM = Stand[illegible] Methods.
Note 5: P = Polyet[illegible] and G = glass

METHOD	CHEMICAL	CASRN	METHOD MDL (μG/L)	USEPA MCL (μg/L)
EPA 625 - SV	Bis(2-chloroethoxy)methane	111911	5.3	
EPA 625 - SV	Bis(2-chloroethyl)ether	111444	5.7	
EPA 625 - SV	Bis(2-chloroisopropyl)ether	108601	5.7	
EPA 625 - SV	Bis(2-ethylhexyl)phthalate	117817	2.5	
EPA 625 - SV	Butyl benzyl phthalate	85687	2.5	
EPA 625 - SV	Chlordane	57749	0.14	
EPA 625 - SV	Chrysene	218019	2.5	
EPA 625 - SV	delta- BHC	319868	3.1	
EPA 625 - SV	di-n- Octyl phthalate	117840	2.5	
EPA 625 - SV	Di-n- butyl phthalate	84722	2.5	
EPA 625 - SV	Dibenzo(a,h)anthracene	53703	2.5	
EPA 625 - SV	Dieldrin	60571	2.5	
EPA 625 - SV	Diethyl phthalate	84662	22	
EPA 625 - SV	Dimethyl phthalate	131113	1.6	
EPA 625 - SV	Endosulfan sulfate	1031078	5.6	
EPA 625 - SV	Endosulfan I	959988	0.011	
EPA 625 - SV	Endosulfan II	33213659	0.017	
EPA 625 - SV	Endrin	72208	0.006	
EPA 625 - SV	Endrin aldehyde	7421934	ND	
EPA 625 - SV	Fluoranthene	206440	2.2	
EPA 625 - SV	Fluorene	86737	1.9	

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METHOD	CHEMICAL	CASRN	METHOD MDL (uG/L)	USEPA MCL (ug/L)
EPA 625 - SV	gamma BHC (Lindane)	58899	9	
EPA 625 - SV	Heptachlor	1024573	1.9	
EPA 625 - SV	Heptachlor Epoxide	176448	2.2	
EPA 625 - SV	Hexachlorobenzene	118741	1.9	
EPA 625 - SV	Hexachlorobutadiene	77744	0.9	
EPA 625 - SV	Hexachlorocyclopentadiene	77744	ND	
EPA 625 - SV	Hexachloroethane	67721	1.6	
EPA 625 - SV	Indeno(1,2,3-cd)pyrene	193395	3.7	
EPA 625 - SV	Isophorone	78591	2.2	
EPA 625 - SV	n- Nitrosodimethylamine	62759	.15	
EPA 625 - SV	n- Nitrosodi-n-propylamine	621647	.46	
EPA 625 - SV	n- Nitrosodiphenylamine	86306	1.9	
EPA 625 - SV	Naphthalene	91203	1.6	
EPA 625 - SV	Nitrobenzene	98953	1.9	
EPA 625 - SV	PCP	87865	3.6	
EPA 625 - SV	Phenanthrene	85018	5.4	
EPA 625 - SV	Phenol	108952	1.5	
EPA 625 - SV	Pyrene	129000	1.9	
EPA 625 - SV	Ronnel	299843	0.3	
EPA 625 - SV	Toxaphene	8001352	9	
EPA 630	Amoban	3566107	ND	

Note 1: MCL will vary from state to state and depend on NPDES requirements set by the state. Write your states permit requirements in this column.
Note 2: Boron, Lithium, Osmium, Strontium, Tin and Vanadium are only done by EPA 200.7 or EPA 200.8.
Note 3: (NP) Not Promulgated.
Note 4: SM = Stan[illegible] Methods.
Note 5: P = Polyet[illegible]e and G = glass

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µG/L)**	**USEPA MCL (µg/L)**
EPA 630	AOP	37333407	ND	
EPA 630	Busan 40	51026289	ND	
EPA 630	Busan 85	1208030	ND	
EPA 630	Ferbam	14484641	ND	
EPA 630	KN Methyl	137417	ND	
EPA 630	Mancozeb	8065676	ND	
EPA 630	Maneb	12327382	15.3	
EPA 630	Metham	137428	3.7	
EPA 630	Nabam	142596	ND	
EPA 630	Niacide	8011663	ND	
EPA 630	Polyram	9006422	ND	
EPA 630	Sodium dimethyldithiocarbamate	128041	ND	
EPA 630	Thiram	137268	ND	
EPA 630	ZAC	52628258	ND	
EPA 630	Zineb	12122677	ND	
EPA 630	Ziram	137304	1.9	
EPA 630.1	Amoban	3566107	1.1	
EPA 630.1	Busan 40	51026289	4.4	
EPA 630.1	Busan 85	1208030	1.3	
EPA 630.1	EXD	502556	5.2	
EPA 630.1	Ferbam	14484641	2.9	

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Note 4: SM = Standard Methods.
Note 5: P = Polyethylene and G = glass

METHOD	CHEMICAL	CASRN	METHOD MDL (uG/L)	USEPA MCL (ug/L)
EPA 630.1	KN Methyl	137417	2.7	
EPA 630.1	Metham	137428	3.1	
EPA 630.1	Nabam	142596	1.6	
EPA 630.1	Nabonate	138932	0.9	
EPA 630.1	Sodium dimethyldithiocarbamate	128041	2.8	
EPA 630.1	Thiram	137268	2.2	
EPA 630.1	Zineb	12122677	4.1	
EPA 630.1	Ziram	137304	4.6	
EPA 632	Aminocarb	2032599	ND	
EPA 632	Barban	101279	0.05	
EPA 632	Carbaryl (Sevin)	63252	0.02	
EPA 632	Carbofuran	1563662	3.2	
EPA 632	Chlorpropham	101213	0.03	
EPA 632	Diuron	330541	0.009	
EPA 632	Fenuron-TCA	4482557	ND	
EPA 632	Fenuron	101428	ND	
EPA 632	Fluometuron	2164172	11.1	
EPA 632	Linuron	330552	0.009	
EPA 632	Methiocarb	2032657	0.02	
EPA 632	Methomyl	16752775	8.9	
EPA 632	Mexacarbate	315184	0.52	

Note 1: MCL will vary from state to state and depend on NPDES requirements set by the state. Write your states permit requirements in this column.
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Note 3: (NP) Not Promulgated.
Note 4: SM = Stan[illegible] Methods.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 632	Monuron	150685	0.003	
EPA 632	Monuron-TCA	140410	ND	
EPA 632	Neburon	555373	0.012	
EPA 632	Oxamyl	23135220	9.2	
EPA 632	Propham	122429	0.07	
EPA 632	Propoxur (Baygon)	114261	0.11	
EPA 632	Siduron	1982496	ND	
EPA 632	Swep	1918189	ND	
EPA 633.1	Fenarimol	60168889	4.	
EPA 633.1	MGK 264-A	136458	2.	
EPA 633.1	MGK 264-B	136458	2.	
EPA 633.1	MGK 326	113384	6.	
EPA 633.1	Pronamide	23950585	4.	
EPA 634	Butylate	2008415	0.6	
EPA 634	Cycloate	1134232	1.6	
EPA 634	EPTC	759944	0.9	
EPA 634	Molinate	2212671	0.6	
EPA 634	Pebulate	1114712	0.8	
EPA 634	Vernolate	1929777	1.1	
EPA 635	Rotenone	83794	1.6	
EPA 636	Bensulide	741582	1.6	

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Note 3: (NP) Not Promulgated.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µG/L)	USEPA MCL (µg/L)
EPA 637	MBTS	120785	0.5	
EPA 637	TCMTB	21564170	1.	
EPA 638	Oryzalin	19044883	0.5	
EPA 639	Bendiocarb	22781233	1.8	
EPA 640	Mercaptobenzothiazole	149304	1.7	
(NP)EPA 102	Alachlor	15972608	0.2	
(NP)EPA 102	Butachlor	23184669	0.2	
(NP)EPA 102	Propachlor	1918167	0.2	
(NP)EPA 109	Bromacil	314409	ND	
(NP)EPA 109	Diuron	330541	ND	
(NP)EPA 109	Hexazinone	51235042	ND	
(NP)EPA 109	Linuron	330552	ND	
(NP)EPA 109	Methomyl	16752775	ND	
(NP)EPA 109	Oxamyl	23135220	ND	
(NP)EPA 109	Terbacil	5902512	ND	
(NP)EPA 113	Chlorpyrifos methyl	5598130	1.	
(NP)EPA 113	Chlorpyrifos	2921882	1.	
(NP)EPA 122	Atrazine	1912249	0.1	
(NP)EPA 122	Dinoseb	88857	0.1	
(NP)EPA 122	Methyl parathion	298000	0.1	
(NP)EPA 122	Toxaphene	8001352	ND	

Note 1: MCL will vary from state to state and depend on NPDES requirements set by the state. Write your states permit requirements in this column.
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Note 3: (NP) Not Promulgated.
Note 4: SM = Stand[illegible] Methods.
Note 5: P = Polyet[illegible] and G = glass

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µG/L)**	**USEPA MCL (µg/L)**
(NP)EPA 130	Dimethoate (Cygon)	60515	25.	
(NP)EPA 130	Famphur	52857	25.	
(NP)EPA 130	Malathion	121755	25.	
(NP)EPA 130	Mephosfolan (Cytrolane)	9501007	25.	
(NP)EPA 130	Phorate (Thimet)	298022	25.	
(NP)EPA 130	Terbufos (Counter)	13071799	25.	
(NP)EPA 402	Benomyl	17804352	ND	
(NP)EPA 402	Carbendazim	10605217	100.	
(NP)EPA 409	Atrazine	1912249	0.14	
(NP)EPA 409	Cyanazine	21725462	0.14	
(NP)EPA 409	Propazine	139402	0.14	
(NP)EPA 409	Simazine	122349	0.14	
NY APC-44	Total Glycols	GLYCOLT	50.	

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Abbreviations	
a	In addition, MCL and MCLG for total nitrate and nitrite is 10 mg/L measured as nitrogen.
MCL	Maximum contaminant level
mg/L	Milligrams per liter
NPDWR	National Primary Drinking Water Regulations
NSDWR	National Secondary Drinking Water Regulations
MDL	Maximum detection level
PM	Promulgated criterion
SDWA	Safe Drinking Water Act
µg/L	Micrograms per Liter
SMCL	Secondiary maximum contaminant level
TDS	Total dissolved solids

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Note 4: SM = Stan[illegible] Methods.
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Recource Conservation and Recovery Act (RCRA)

Collection Table

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 600/4-81-045 PCBs in oil	Fill 20 mm o.d. X 150 mm long Pyrex brand culture tube with 18-415 G.P.I. thread finish teflon lined screw caps (Corning catalog # 9826-20X, GSA code 405925 9826) 1/3 to 1/2 full of oil.	None	None
EPA 1010 (Ignitability)	Liquid-500 ml G (Pensky-Marten)	none	Indefinite Note 2
EPA 1020 (Ignitability)	Liquid-500 ml G (Setaflash)	none	Indefinite
EPA 1110 (Corrosivity to steel)	Liquid-1 liter G	Cool to 4° C	21 days Note 2
EPA 6010 Aluminum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Antimony	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Arsenic	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Barium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Beryllium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 6010 Cadmium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Calcium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Chromium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Cobalt	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Copper	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Iron	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Lead	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Lithium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Magnesium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Manganese	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Molybdenum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

Note 1: SM = Standard Methods
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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 6010 Nickel	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Phosphorus	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Potassium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Selenium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Silver	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Sodium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Strontium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Thallium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Vanadium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 6010 Zinc	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Aluminum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

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G = Glass
P = Polyethylene

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7000A - Flame Antimony	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Arsenic	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Beryllium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Cadmium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Calcium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Chromium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Cobalt	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Copper	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Iron	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7000A - Flame Lead	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Lithium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Magnesium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Manganese	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Molybdenum	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Osmium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Potassium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Selenium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7000A - Flame Silver	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Strontium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Thallium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Tin	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Vanadium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Flame Zinc	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Antimony	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7060A- Furnace Arsenic	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Barium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7000A - Furnace Beryllium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Chromium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Cobalt	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Copper	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Iron	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Lead	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Manganese	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Silver	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7000A - Furnace Thallium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Vanadium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7000A - Furnace Zinc	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7060/7161 (As)	Solid-250 grams G/P	Cool to 4° C	14 days
EPA 7060/7161 (As)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7080/7081 (Ba)	Solid-250 grams G/P	Cool to 4° C	14 days
EPA 7080/7081 (Ba)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7130/7131A (Cd)	Solid-250 grams G/P	Cool to 4° C	14 days
EPA 7130/7131A (Cd)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7190/7191 (Cr)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7190/7191 (Cr)	Solid-250 grams G/P	Cool to 4° C	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 7420/7421 (Pb)	Solid-250 grams G/P	Cool to 4° C	14 days
EPA 7420/7421 (Pb)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7470A/7471A Mercury - (Cold Vapor Method)	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	28 Days
EPA 7470/7471 (Hg)	Solid-250 grams G/P	Cool to 4° C	14 days
EPA 7470/7471 (Hg)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7740A - Furnace Selenium	1 Liter, plastic or glass	Add 1:1 Nitric Acid:Distilled Water to pH <2	6 months
EPA 7740/7741A (Se)	Solids-250 grams G/P	Cool to 4° C	14 days
EPA 7740/7741A (Se)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7760/7760A (Ag)	Liquid-1 liter G/P	Cool to 4° C	13 days
EPA 7760/7760A (Ag)	Solids-250 grams G/P	Cool to 4° C	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 8010 (Halogenated Volatiles)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Add 1:1 Sodium Thiosulphate:Hydrochloric Acid to a pH <2. Cool to 4°C.	14 days
	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool to 4°C.	14 days
EPA 8011 (EDB, DBCP)	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Add 4 drops conc. HCl. Cool 4 degrees centigrade. If chlorinated, add 4 drops 10% sodium thiosulfate. Ship overnight on ice.	14 days
	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
EPA 8015 (Calif. Modified-gasoline/diesel)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Add 1:1 Sodium Thiosulphate:Hydrochloric Acid to a pH <2. Cool to 4°C.	14 days
	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool to 4°C.	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 8020 (Volatile Aromatics)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Add 1:1 Sodium Thiosulphate:Hydrochloric Acid to a pH <2. Cool to 4°C.	14 days
	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool to 4°C.	14 days
EPA 8031 (Acrylonitrile)	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Adjust to pH 4 to 5. Cool 4 degrees centigrade. Ship overnight on ice.	14 days
EPA 8032 (Acrylamide)	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Add 4 drops conc. HCl. Cool 4 degrees centigrade. If chlorinated, add 4 drops 10% sodium thiosulfate. Ship overnight on ice.	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 8040 (Phenols)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8060 (Phthalates)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8061 (Phthalates)	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner.	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner.	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 8070 (Nitrosoamines)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8080B (Organochlorine Pesticides + PCBs)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Adjust pH = 5 to 9. Cool to 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8081 (Organochlorine Pesticides + PCBs)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 8090 (Polyaromatic Hydrocarbons - PAH)	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8100 (Polyaromatic Hydrocarbons - PAH)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8110 (Haloethers)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8120A (Chlorinated Hydrocarbons)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
EPA 8121 (Chlorinated Hydrocarbons)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8140 (Organophosphorus Pesticides)	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8141A (Organophosphorus Pesticides)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPÀ 8150B (Chlorinated Herbicides)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
EPA 8151 (Chlorinated Herbicides)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice	Extract within 7 days of collection. Analyze within 40 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8260 (GC/MS Volatiles)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 3 x 40 ml vials with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
EPA 8270 (GC/MS Semi-Volatiles)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	Extract within 14 days and analyze within 40 days after extraction.
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice	Extract within 7 days and analyze within 40 days after extraction.
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	Extract within 14 days and analyze within 40 days after extraction.
EPA 8315 (Formaldehyde)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	Derivitize within 5 days of collection. Analyze within 8 days of collection.
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Derivitize within 5 days of collection. Analyze within 8 days of collection.

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	Derivitize within 5 days of collection. Analyze within 8 days of collection.
EPA 8316 (Acrylamide, Acryloitrile, Acrolien)	SOIL/SEDIMENTS AND SLUDGES: 4 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: Two 40-ml glass vials with teflon lined septum caps	Adjust to pH 4 to 5. Cool 4 degrees centigrade. Ship overnight on ice.	14 days
EPA 8318 (n-Methylcarbamates)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Adjust pH to 4 to 5 with 0.1 N chloroacetic acid. Cool 4 degrees centigrade. Protect light. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8321 (Azo Dyes + Alkaloids)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8330 (Nitroaromatics + Nitroamines)	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
EPA 8331 (Tetrazene)	SOIL/SEDIMENTS AND SLUDGES: 8 oz. widemouth glass bottle with teflon liner.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 1 gal. amber glass bottle with teflon liner	Cool 4 degrees centigrade. If chlorinated, add 3 ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 8 oz. widemouth glass bottle with teflon liner	None	14 days
EPA 9010A (Cyanide)	Liquid-1 liter G/P	Cool to 4°C	14 days
EPA 9010A (Cyanide)	Solid-250 grams G/P	Cool to 4°C	14 days

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 9020 (TOX - Total Organic Halides)	SOIL/SEDIMENTS AND SLUDGES: 250-ml amber glass bottle with teflon lined caps. Eliminate headspace by overfilling the bottle before capping.	Cool 4 degrees centigrade and ship overnight on ice.	14 days
	LIQUID SAMPLE: 250-ml amber glass bottle with teflon lined caps. Eliminate headspace by overfilling the bottle before capping.	Adjust pH < 2. Cool to 4 degrees centigrade If chlorinated, add 3ml 10% sodium thiosulfate per gallon. Ship overnight on ice.	Extract within 7 days of collection. Analyze within 40 days of collection.
	CONCENTRATED WASTE SAMPLES: 250-ml amber glass bottle with teflon lined caps. Eliminate headspace by overfilling the bottle before capping.	None	14 days
EPA 9030A (Sulfide)	Solid-250 grams G	Cool to 4°C	7days
EPA 9030A (Sulfide)	Liquid-1 liter G	Cool to 4°C	7days
EPA 9031 (Sulfide,Extractable)	Liquid-1 liter G	Cool to 4°C	7days
EPA 9031 (Sulfide,Extractable)	Solid-250 grams G	Cool to 4°C	7days
EPA 9040 (pH)	Liquid (aqueous) 500 mls G/P	Cool to 4°C	ASAP

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METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 9041 (pH, paper method)	Solid-100 grams G/P	Cool to 4°C	ASAP
EPA 9095 Filter paper test	Solid-100 grams G/P	none	Indefinite
EPA 600/4-81-045 PCB in oil	Fill 20 mm o.d. X 150 mm long Pyrex brand culture tube with 18-415 G.P.I. thread finish teflon lined screw caps (Corning catalog # 9826-20X, GSA code 405925 9826) 1/3 to 1/2 full of oil.	None	None
NY APC-44 (Ethylene Glycol)	Collect 1 liter of water in a glass bottle with a teflon-lined screw cap.	Keep at 4 degrees Centigrade from time of collection until analyzed. Adjust pH <2 with 1 + 1 HCL (approximately 1ml per liter of water). Ship on ice by overnight express.	Analyze as soon as possible after collection.
SM 2330 (Corrosivity) Note 1	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 2330 (Langlier Index) Note 1	N/A	Calculated from temperature, pH, Residue (TDS), Alkalinity, Calcium	N/A
SM 4500 (Ozone) Note 1	1 Liter P,G	Cool to 4°C	N/A

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Resource Conservation and Recovery Act (RCRA)

MDL Table

METHOD	CHEMICAL	CASRN	METHOD MDL (ug/L)	USEPA MCL (ug/L)
EPA 1010	Ignitability	FPCC	N/A	
EPA 1110	Corrosivity towards steel	COR	N/A	
EPA 6010	Arsenic	7440382	53	
EPA 6010	Barium	7440393	2.	
EPA 6010	Cadmium	7440439	4.	
EPA 6010	Chromium	7440473	7.	
EPA 6010	Lead	7439921	42.	
EPA 6010	Selenium	7782492	75.	
EPA 6010	Silver	7440224	7.	
EPA 7060	Arsenic	7440382	2	
EPA 7061	Arsenic	7440382	1.	
EPA 7080	Barium	7440393	100	
EPA 7081	Barium	7440393	0.2	
EPA 7130	Cadmium	7440439	5	
EPA 7131A	Cadmium	7440439	0.1	
EPA 7190	Chromium	7440473	50	
EPA 7191	Chromium	7440473	1.0	
EPA 7420	Lead	7439921	100	

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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 7421	Lead	7439921	1.	
EPA 7470	Mercury	7439976	.2	
EPA 7471	Mercury	7439976	.2	
EPA 7740	Selenium	7782492	2	
EPA 7741	Selenium	7782492	2.	
EPA 7760	Silver	7440224	10	
EPA 7761	Silver	7440224	0.2	
EPA 8010	1,1- Dichloroethene	75354	1	
EPA 8010	1,1- Dichloroethane	75343	1	
EPA 8010	1,1,1- Trichloroethane	71556	1	
EPA 8010	1,1,1,2- Tetrachloroethane	100425	1	
EPA 8010	1,1,2- Trichloroethane	79005	1	
EPA 8010	1,1,2,2- Tetrachloroethane	630206	1	
EPA 8010	1,2- Dichloroethane	107062	1	
EPA 8010	1,2- Dichloropropane	78875	1	
EPA 8010	1,2- Dichlorobenzene	95501	1	
EPA 8010	1,3- Dichlorobenzene	541731	1	
EPA 8010	1,4- Dichlorobenzene	106467	1	
EPA 8010	Bromobenzene	108861	1	
EPA 8010	Bromodichloromethane	75274	1	
EPA 8010	Bromoform	75252	1	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8010	Bromomethane	748395	1	
EPA 8010	Carbon Tetrachloride	56235	1	
EPA 8010	Chlorobenzene	108907	1	
EPA 8010	Chlorodibromomethane	124481	1	
EPA 8010	Chloroethane	75003	1	
EPA 8010	Chloroform	67663	1	
EPA 8010	cis-1,3- Dichloropropene	10061015	1	
EPA 8010	Dibromomethane	74953	1	
EPA 8010	Dichlorodifluoromethane	75718	1	
EPA 8010	Dichloromethane	75092	1	
EPA 8010	Tetrachloroethene	79345	1	
EPA 8010	trans-1,2- Dichloroethene	156605	1	
EPA 8010	trans-1,3- Dichloropropene	10061026	1	
EPA 8010	Trichloroethylene	79016	1	
EPA 8010	Trichlorofluoromethane	75694	1	
EPA 8010	Trichloropropane	96184	1	
EPA 8010	Vinyl chloride	75014	1	
EPA 8011	1,2-Dibromoethane (EDB)	106934	0.010	
EPA 8011	1,2-Dibromo-3-chloropropane (DBCP)	96128	0.010	
EPA 8020	1,2(o)-Dichlorobenzene	95501	1	
EPA 8020	1,3(m)-Dichlorobenzene	541731	1	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (μg/L)	USEPA MCL (μg/L)
EPA 8020	1,4(p)-Dichlorobenzene	106467	1	
EPA 8020	Benzene	71432	1	
EPA 8020	Chlorobenzene	108907	1	
EPA 8020	Ethylbenzene	100414	1	
EPA 8020	m-xylene	108383	1	
EPA 8020	o-xylene	95476	1	
EPA 8020	p-xylene	106423	1	
EPA 8020	Toluene	108883	1	
EPA 8031	Acrylonitrile	107131	10.0	
EPA 8032	Acrylamide	79061	0.032	
EPA 8040	2-Chlorophenol	105679	0.580	
EPA 8040	2-Methyl-4,6-Dinitrophenol	51285	16.0	
EPA 8040	2-Nitrophenol	88755	0.770	
EPA 8040	2,4-Dinitrophenol	95578	13.0	
EPA 8040	2,4-Dimethylphenol	79061	0.630	
EPA 8040	2,4-Dichlorophenol	59507	0.680	
EPA 8040	2,4,6-Trichlorophenol	100027	0.640	
EPA 8040	4-Chloro-3-methylphenol	88062	1.80	
EPA 8040	4-Nitrophenol	100027	2.80	
EPA 8040	Pentachlorophenol	120832	7.40	
EPA 8040	Phenol	108952	2.20	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8060	Bis(2-ethylhexyl) phthalate	117817	20.0	
EPA 8060	Butyl benzyl phthalate	85687	15.0	
EPA 8060	Di-n-octyl phthalate	117840	31.0	
EPA 8060	Di-n-butyl phthalate	84742	14.0	
EPA 8060	Diethyl phthalate	84662	31.0	
EPA 8060	Dimethyl phthalate	131113	19.0	
EPA 8061	Bis(2-n-butoxyethyl) phthalate	117839	0.084	
EPA 8061	Bis(2-ethylhexyl) phthalate	117817	0.270	
EPA 8061	Bis(2-methoxyethyl) phthalate	117828	0.510	
EPA 8061	Bis(2-ethoxyethyl) phthalate	605549	0.270	
EPA 8061	Bis(4-methyl-2-pentyl) phthalate	146509	0.370	
EPA 8061	Butyl benzyl phthalate	85687	0.042	
EPA 8061	Di-n-butyl phthalate	84742	0.330	
EPA 8061	Di-n-octyl phthalate	117840	0.049	
EPA 8061	Diamyl phthalate	84764	0.110	
EPA 8061	Dicyclohexyl phthalate	84617	0.022	
EPA 8061	Diethyl phthalate	84662	0.250	
EPA 8061	Dihexyl phthalate	84753	0.068	
EPA 8061	Diisobutyl phthalate	84695	0.120	
EPA 8061	Dimethyl phthalate	131113	0.640	
EPA 8061	Dinonyl phthalate	84764	0.022	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8061	Hexyl 2-ethylhexyl phthalate	75673164	0.130	
EPA 8070	N-nitrosodi-n-propylamine	621647	0.460	
EPA 8070	N-nitrosodiphenylamine	86306	0.810	
EPA 8070	N-nitrosodimethylamine	62759	0.150	
EPA 8080B	4,4'-Methoxychlor	72435	0.176	
EPA 8080B	4,4'-DDT	50293	0.012	
EPA 8080B	4,4'-DDD	72548	0.011	
EPA 8080B	4,4'-DDE	72559	0.004	
EPA 8080B	Aldrin	309002	0.004	
EPA 8080B	alpha-BHC	319846	0.003	
EPA 8080B	Aroclor 1254	11097691	ND	
EPA 8080B	Aroclor 1016	12674112	ND	
EPA 8080B	Aroclor 1260	11096825	ND	
EPA 8080B	Aroclor 1242	53469219	0.065	
EPA 8080B	Aroclor 1221	1104282	ND	
EPA 8080B	Aroclor 1232	11141165	ND	
EPA 8080B	Aroclor 1248	12672296	ND	
EPA 8080B	beta-BHC	319857	0.006	
EPA 8080B	Chlordane	12789036	0.014	
EPA 8080B	delta-BHC	319868	0.009	
EPA 8080B	Dieldrin	60571	0.002	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8080B	Endosulfan sulfate	1031078	0.066	
EPA 8080B	Endosulfan I	959988	0.014	
EPA 8080B	Endosulfan II	33212659	0.004	
EPA 8080B	Endrin aldehyde	7421934	0.023	
EPA 8080B	Endrin	72208	0.006	
EPA 8080B	Heptachlor	76448	0.003	
EPA 8080B	Heptachlor Epoxide	1024573	0.083	
EPA 8080B	Lindane (gamma-BHC)	58899	0.004	
EPA 8080B	Toxaphene	8001352	0.240	
EPA 8081	4,4'-DDE	72559	0.058	
EPA 8081	4,4'-DDT	50293	0.081	
EPA 8081	4,4'-Methoxychlor	72435	0.086	
EPA 8081	4,4'-DDD	72548	0.050	
EPA 8081	Aldrin	309002	0.034	
EPA 8081	alpha-BHC	319846	0.035	
EPA 8081	Aroclor 1260	11096825	0.900	
EPA 8081	Aroclor 1254	11097691	ND	
EPA 8081	Aroclor 1232	1141165	ND	
EPA 8081	Aroclor 1016	12674112	ND	
EPA 8081	Aroclor 1248	12672296	ND	
EPA 8081	Aroclor 1221	1104282	0.054	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µg/L)**	**USEPA MCL (µg/L)**
EPA 8081	Aroclor 1242	53469219	ND	
EPA 8081	beta-BHC	319857	0.023	
EPA 8081	Chlordane	12789036	0.037	
EPA 8081	delta-BHC	319868	0.024	
EPA 8081	Dieldrin	60571	0.044	
EPA 8081	Endosulfan I	959988	0.030	
EPA 8081	Endosulfan sulfate	1031078	0.035	
EPA 8081	Endosulfan II	33212659	0.040	
EPA 8081	Endrin aldehyde	7421934	0.050	
EPA 8081	Endrin	72208	0.039	
EPA 8081	Heptachlor	76448	0.040	
EPA 8081	Heptachlor Epoxide	1024573	0.032	
EPA 8081	Lindane (gamma-BHC)	58899	0.025	
EPA 8081	Toxaphene	8001352	0.086	
EPA 8090	2,4-Dinitrotoluene	121142	0.020	
EPA 8090	2,6-Dinitrotoluene	606202	0.010	
EPA 8090	Isophorone	78591	15.7	
EPA 8090	Naphthoquinone	130154	ND	
EPA 8090	Nitrobenzene	98953	13.7	
EPA 8090	o-Dinitrobenzene	528290	ND	
EPA 8100	Acenaphthene	83329	ND	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8100	Acenaphthylene	208968	ND	
EPA 8100	Anthracene	120127	ND	
EPA 8100	Benzo(a)anthracene	56553	ND	
EPA 8100	Benzo(a)pyrene	50328	ND	
EPA 8100	Benzo(b)fluoranthene	205992	ND	
EPA 8100	Benzo(g,h,i)perylene	191242	ND	
EPA 8100	Benzo(k)fluoranthene	207089	ND	
EPA 8100	Chrysene	218019	ND	
EPA 8100	Dibenz(a,h)anthracene	53703	ND	
EPA 8100	Fluoranthene	206440	ND	
EPA 8100	Fluorene	86737	ND	
EPA 8100	Indeno(1,2,3-cd)pyrene	193395	ND	
EPA 8100	Naphthalene	106445	ND	
EPA 8100	Phenanthrene	85018	ND	
EPA 8100	Pyrene	129000	ND	
EPA 8110	4-Bromophenyl phenyl ether	101553	2.3	
EPA 8110	4-Chlorophenyl phenyl ether	7005723	3.9	
EPA 8110	Bis(2-chloroisopropyl) ether	108601	0.800	
EPA 8110	Bis(2-chloroethyl) ether	111444	0.300	
EPA 8110	Bis(2-chloroethoxy) methane	111911	0.500	
EPA 8120A	1,2-Dichlorobenzene	95501	1.140	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8120A	1,2,4-Trichlorobenzene	120821	0.050	
EPA 8120A	1,3-Dichlorobenzene	541731	1.190	
EPA 8120A	1,4-Dichlorobenzene	106467	1.340	
EPA 8120A	2-Chloronaphthalene	91587	0.940	
EPA 8120A	Hexachlorobenzene	118741	0.050	
EPA 8120A	Hexachlorobutadiene	87683	0.340	
EPA 8120A	Hexachlorocyclopentadiene	77474	0.400	
EPA 8120A	Hexachloroethane	67721	0.030	
EPA 8121	1,2-Dichlorobenzene	95501	0.270	
EPA 8121	1,2,3-Trichlorobenzene	87616	0.039	
EPA 8121	1,2,3,4-Tetrachlorobenzene	634662	0.011	
EPA 8121	1,2,3,5-Tetrachlorobenzene	634902	0.00810	
EPA 8121	1,2,4-Trichlorobenzene	120821	0.130	
EPA 8121	1,2,4,5-Tetrachlorobenzene	95943	0.00950	
EPA 8121	1,3-Dichlorobenzene	541731	0.250	
EPA 8121	1,3,5-Trichlorobenzene	108703	0.012	
EPA 8121	1,4-Dichlorobenzene	106461	0.890	
EPA 8121	2-Chloronaphthalene	91587	1.3	
EPA 8121	alpha-BHC	319846	0.011	
EPA 8121	Benzal chloride	98873	0.005	
EPA 8121	Benzotrichloride	98077	0.006	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8121	Benzyl chloride	100447	0.180	
EPA 8121	beta-BHC	319857	0.031	
EPA 8121	delta-BHC	319868	0.020	
EPA 8121	Hexachlorobenzene	118741	0.00560	
EPA 8121	Hexachlorobutadiene	87683	0.00140	
EPA 8121	Hexachlorocyclopentadiene	77474	0.240	
EPA 8121	Hexachloroethane	67721	0.00160	
EPA 8121	Lindane	58899	0.023	
EPA 8121	Pentachlorobenzene	608935	0.038	
EPA 8140	Azinophos methyl	86500	1.5	
EPA 8140	Bolstar	35400432	0.150	
EPA 8140	Chlorpyrifos (Dursban)	2921882	0.300	
EPA 8140	Coumaphos	56724	1.5	
EPA 8140	Demeton-S	8065483	0.250	
EPA 8140	Demeton-O	8065483	0.250	
EPA 8140	Diazinon	333415	0.600	
EPA 8140	Dichlorvos	62737	0.100	
EPA 8140	Disulfoton	298044	0.200	
EPA 8140	Ethoprop	13194484	0.250	
EPA 8140	Fensulfothion	115902	1.5	
EPA 8140	Fenthion	55389	0.100	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8140	Merphos	15050	0.250	
EPA 8140	Mevinphos	7786347	0.300	
EPA 8140	Naled	300765	0.100	
EPA 8140	Parathion methyl	298000	0.030	
EPA 8140	Phorate	298022	0.150	
EPA 8140	Ronnel	299843	0.300	
EPA 8140	Stirofos	22248799	5.0	
EPA 8140	Tokuthion	34643464	0.500	
EPA 8140	Trichloronate	327980	0.150	
EPA 8141A	Azinophos methyl	86500	0.100	
EPA 8141A	Bolstar	35400432	0.070	
EPA 8141A	Chlorpyrifos (Dursban)	2921882	0.070	
EPA 8141A	Coumaphos	56724	0.200	
EPA 8141A	Demeton-O and -S	8065483	0.120	
EPA 8141A	Diazinon	333415	0.200	
EPA 8141A	Dichlorvos	62737	0.800	
EPA 8141A	Dimethoate	60515	0.260	
EPA 8141A	Disulfoton	298044	0.070	
EPA 8141A	EPN	2104645	0.040	
EPA 8141A	Ethoprop	131994484	0.200	
EPA 8141A	Fensulfothion	115902	0.080	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8141A	Fenthion	55389	0.080	
EPA 8141A	Malathion	121755	0.110	
EPA 8141A	Merphos	150505	0.200	
EPA 8141A	Mevinphos	7786347	0.500	
EPA 8141A	Monocrotophos	6923224	ND	
EPA 8141A	Naled	300765	0.500	
EPA 8141A	Parathion ethyl	56382	0.060	
EPA 8141A	Parathion methyl	298000	0.120	
EPA 8141A	Phorate	298022	0.040	
EPA 8141A	Ronnel	299843	0.070	
EPA 8141A	Stirofos	22248799	0.800	
EPA 8141A	Sulfotep	3689245	0.070	
EPA 8141A	TEPP	21646991	0.800	
EPA 8141A	Tokuthion	34643464	0.070	
EPA 8141A	Trichloronate	327980	0.800	
EPA 8150B	2,4-D	94757	1.2	
EPA 8150B	2,4-DB	94826	0.910	
EPA 8150B	2,4,5-T	93765	0.200	
EPA 8150B	2,4,5-TP (Silvex)	93721	0.170	
EPA 8150B	Dalapon	75990	5.8	
EPA 8150B	Dicamba	1918009	0.270	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8150B	Dichlorprop	120365	0.650	
EPA 8150B	Dinoseb	88857	0.070	
EPA 8150B	MCPA	94746	249	
EPA 8150B	MCPP	93652	192	
EPA 8151	2,4-DB	94826	0.800	
EPA 8151	2,4-D	94757	0.200	
EPA 8151	2,4,5-T	93765	0.080	
EPA 8151	2,4,5-TP (Silvex)	93721	0.075	
EPA 8151	3,5-Dichlorobenzoic acid	51365	0.061	
EPA 8151	4-Nitrophenol	100021	0.130	
EPA 8151	5-Hydroxydicamba	7600502	0.040	
EPA 8151	Acifluorfen	50594666	0.096	
EPA 8151	Bentazon	25057890	0.200	
EPA 8151	Chloramben	133904	0.093	
EPA 8151	Dalapon	75990	1.3	
EPA 8151	DCPA acid (metabolites)	2136790	0.020	
EPA 8151	Dicamba	1918009	0.081	
EPA 8151	Dichlorprop	120365	0.260	
EPA 8151	Dinoseb	88857	0.190	
EPA 8151	MCPA	94746	0.056	
EPA 8151	MCPP	93652	0.090	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL ($\mu g/L$)	USEPA MCL ($\mu g/L$)
EPA 8151	Pentachlorophenol (PCP)	87865	0.076	
EPA 8151	Picloram	1918021	0.140	
EPA 8260	1,1-Dichloroethane	75343	5	
EPA 8260	1,1-Dichloroethylene	75354	5	
EPA 8260	1,1-Dichloropropene	563586	5	
EPA 8260	1,1,1-Trichloroethane	71556	5	
EPA 8260	1,1,1,2-Tetrachloroethane	630206	5	
EPA 8260	1,1,2-Trichloroethane	79005	5	
EPA 8260	1,1,2,2-Tetrachloroethane	79345	5	
EPA 8260	1,2-Dibromo-3-chloropropane(DBCP)	542767	100	
EPA 8260	1,2-Dibromoethane (EDB)	106934	5	
EPA 8260	1,2-Dichlorobenzene	95501	5	
EPA 8260	1,2-Dichloroethane	107062	5	
EPA 8260	1,2-Dichloropropane	78875	5	
EPA 8260	1,2,3-Trichlorobenzene	87616	5	
EPA 8260	1,2,3-Trichloropropane	96184	5	
EPA 8260	1,2,3,4-Diepoxybutane	1464535	5	
EPA 8260	1,2,4-Trichlorobenzene	120821	5	
EPA 8260	1,2,4-Trimethylbenzene	95636	5	
EPA 8260	1,3-Dichloro-2-propanol	96231	5	
EPA 8260	1,3-Dichlorobenzene	541731	5	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8260	1,3-Dichloropropane	142289	5	
EPA 8260	1,3,5-Trimethylbenzene	108678	5	
EPA 8260	1,4-Dichloro-2-butene	764410	100	
EPA 8260	1,4-Dichlorobenzene	106467	5	
EPA 8260	1,4-Dioxane	123911	5	
EPA 8260	2-Butanone	78933	100	
EPA 8260	2-Chloroethanol	107073	5	
EPA 8260	2-Chloroethyl vinyl ether	110758	10	
EPA 8260	2-Chlorotoluene	95498	5	
EPA 8260	2-Hexanone	591786	50	
EPA 8260	2-Hydroxypropionitrile	78977	5	
EPA 8260	2-Picoline	109068	5	
EPA 8260	2,2-Dichloropropane	594207	5	
EPA 8260	3-Chloropropionitrile	542767	5	
EPA 8260	4-Chlorotoluene	106434	5	
EPA 8260	4-Isopropyltoluene	99876	5	
EPA 8260	4-Methyl-2-pentanone	108101	50	
EPA 8260	Acetone	67641	100	
EPA 8260	Acetonitrile	75058	100	
EPA 8260	Acrolein	107028	5	
EPA 8260	Acrylonitrile	107131	5	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (ug/L)	USEPA MCL (ug/L)
EPA 8260	Allyl alcohol	107186	5	
EPA 8260	Allyl chloride	107051	5	
EPA 8260	Benzene	71432	5	
EPA 8260	Benzyl chloride	100447	100	
EPA 8260	beta-Propiolactone	57578	5	
EPA 8260	Bromoacetone	598312	5	
EPA 8260	Bromobenzene	108861	5	
EPA 8260	Bromochloromethane	74975	5	
EPA 8260	Bromodichloromethane	75274	5	
EPA 8260	Bromoform	75252	5	
EPA 8260	Bromomethane	74839	10	
EPA 8260	Carbon disulfide	75150	100	
EPA 8260	Carbon Tetrachloride	56235	5	
EPA 8260	Chlorobenzene	108907	5	
EPA 8260	Chlorodibromomethane	124481	5	
EPA 8260	Chloroethane	75003	10	
EPA 8260	Chloroform	67663	5	
EPA 8260	Chloromethane	74873	10	
EPA 8260	Chloroprene	126998	5	
EPA 8260	cis-1,2-Dichloroethene	156592	5	
EPA 8260	cis-1,3-Dichloropropene	10061015	5	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8260	Dibromomethane	74953	5	
EPA 8260	Dichlorodifluoromethane	75718	5	
EPA 8260	Epichlorohydrin	106898	5	
EPA 8260	Ethanol	64175	5	
EPA 8260	Ethyl methacrylate	97632	5	
EPA 8260	Ethyl Benzene	100414	5	
EPA 8260	Ethylene oxide	75218	5	
EPA 8260	Hexachlorobutadiene	87683	5	
EPA 8260	Iodomethane	74884	5	
EPA 8260	Isobutyl alcohol	78831	100	
EPA 8260	Isopropylbenzene	98828	5	
EPA 8260	m-Xylene	95476	5	
EPA 8260	Malononitrile	109772	5	
EPA 8260	Methacrylonitrile	126987	100	
EPA 8260	Methyl iodide	74884	5	
EPA 8260	Methyl methacrylate	80626	5	
EPA 8260	Methylene Chloride	75092	5	
EPA 8260	n-Butylbenzene	104518	5	
EPA 8260	n-Propylamine	107108	5	
EPA 8260	n-Propylbenzene	103651	5	
EPA 8260	Naphthalene	91203	5	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8260	o-Xylene	108383	5	
EPA 8260	p-Xylene	106423	5	
EPA 8260	Pentachloroethane	76017	10	
EPA 8260	Propargyl alcohol	107197	5	
EPA 8260	Propionitrile	107120	100	
EPA 8260	Pyridine	110861	5	
EPA 8260	sec-Butylbenzene	135988	5	
EPA 8260	Styrene	100425	5	
EPA 8260	tert-Butylbenzene	98066	5	
EPA 8260	Tetrachloroethene	127184	5	
EPA 8260	Toluene	108883	5	
EPA 8260	trans-1,2-Dichloroethene	156605	5	
EPA 8260	trans-1,3-Dichloropropene	10061026	5	
EPA 8260	Trichloroethylene	79016	5	
EPA 8260	Trichlorofluoromethane	75694	5	
EPA 8260	Vinyl chloride	75014	10	
EPA 8260	Vinyl acetate	108054	50	
EPA 8260	Xylene (Total)	1330207	5	
EPA 8270 - SV	α,α- Dimethylphenethylamine	122098	ND	
EPA 8270 - SV	1- Chloronaphthalene	90131	ND	
EPA 8270 - SV	1- Acetyl-2-thiourea	591082	1000	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	1-Naphthylamine	134327	10	
EPA 8270 - SV	1,2- Dinitrobenzene	528290	40	
EPA 8270 - SV	1,2- Dichlorobenzene	95501	10	
EPA 8270 - SV	1,2- Diphenylhydrazine	12267	ND	
EPA 8270 - SV	1,2,4- Trichlorobenzene	120821	10	
EPA 8270 - SV	1,2,4,5- Tetrachlorobenzene	95943	10	
EPA 8270 - SV	1,3- Dinitrobenzene	99650	20	
EPA 8270 - SV	1,3- Dichlorobenzene	541731	10	
EPA 8270 - SV	1,3,5- Trinitrobenzene	99354	10	
EPA 8270 - SV	1,4- Phenylenediamine	106503	10	
EPA 8270 - SV	1,4- Dichlorobenzene	106467	10	
EPA 8270 - SV	1,4- Dinitrobenzene	100254	40	
EPA 8270 - SV	2- Chlorophenol	95578	10	
EPA 8270 - SV	2- Aminoanthraquinone	117793	20	
EPA 8270 - SV	2- Nitroaniline	88744	50	
EPA 8270 - SV	2- Acetylaminofluorene	53963	20	
EPA 8270 - SV	2- Cyclohexyl-4,6-dinitrophenol	131895	100	
EPA 8270 - SV	2- Chloronaphthalene	91587	10	
EPA 8270 - SV	2- Methylphenol	95487	10	
EPA 8270 - SV	2- Naphthylamine	134327	10	
EPA 8270 - SV	2- Methylnaphthalene	91576	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	2- Nitrophenol	88755	10	
EPA 8270 - SV	2,2,3,4,6- Pentachlorobiphenyl	60233252	ND	
EPA 8270 - SV	2,3,4,6- Tetrachlorophenol	58902	10	
EPA 8270 - SV	2,4- Diaminotoluene	95807	20	
EPA 8270 - SV	2,4- Dimethylphenol	105679	10	
EPA 8270 - SV	2,4- Dinitrophenol	51285	50	
EPA 8270 - SV	2,4- Dichlorophenol	120832	10	
EPA 8270 - SV	2,4- Dinitrotoluene	121142	10	
EPA 8270 - SV	2,4,5- Trichlorophenol	95944	10	
EPA 8270 - SV	2,4,5- Trimethylaniline	137177	10	
EPA 8270 - SV	2,4,6- Trichlorophenol	95954	2.7	
EPA 8270 - SV	2,4,6- Trichlorophenol	88062	10	
EPA 8270 - SV	2,6- Dinitrotoluene	606202	10	
EPA 8270 - SV	2,6- Dichlorophenol	87650	10	
EPA 8270 - SV	3- Chloromethyl pyridine hydrochloride	6959484	100	
EPA 8270 - SV	3- Methylphenol	108394	10	
EPA 8270 - SV	3- Nitroaniline	99092	50	
EPA 8270 - SV	3- Methylcholanthrene	56495	10	
EPA 8270 - SV	3,3'- Dichlorobenzidine	91941	20	
EPA 8270 - SV	3,3'- Dimethylbenzidine	612828	10	
EPA 8270 - SV	3,3'- Dimethoxybenzidine	119904	100	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	4- Chloro-3-methylphenol	59507	20	
EPA 8270 - SV	4- Aminobiphenyl	92671	20	
EPA 8270 - SV	4- Nitroaniline	100016	20	
EPA 8270 - SV	4- Nitrophenol	100027	50	
EPA 8270 - SV	4- Chloroaniline	106478	20	
EPA 8270 - SV	4- Methylphenol	106445	10	
EPA 8270 - SV	4- Bromophenyl phenyl ether	101553	10	
EPA 8270 - SV	4- Chlorophenyl phenyl ether	7005723	10	
EPA 8270 - SV	4- Nitrobiphenyl	92933	10	
EPA 8270 - SV	4,4'- DDD	72548	2.8	
EPA 8270 - SV	4,4'- DDE	72559	ND	
EPA 8270 - SV	4,4'- DDT	50293	4.7	
EPA 8270 - SV	4,4- Methylenebis(2-chloraniline)	101144	ND	
EPA 8270 - SV	4,4- Oxydianiline	101804	20	
EPA 8270 - SV	4,6- Dinitro-2-methylphenol	534521	50	
EPA 8270 - SV	5- Nitroacenaphthene	602879	10	
EPA 8270 - SV	5- Chloro-2-methylaniline	95794	10	
EPA 8270 - SV	5- Nitro-o-toluidine	99558	10	
EPA 8270 - SV	5- Nitro-o-anisidine	99592	10	
EPA 8270 - SV	5- Nitro-o-toluidine	99558	10	
EPA 8270 - SV	5,5- Diphenylhydantoin	57410	20	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (ug/L)	USEPA MCL (ug/L)
EPA 8270 - SV	7,12- Dimethylbenz(a)anthracene	57976	10	
EPA 8270 - SV	Acenaphthene	83329	10	
EPA 8270 - SV	Acenaphthylene	208968	10	
EPA 8270 - SV	Acetophenone	98862	10	
EPA 8270 - SV	Aldrin	309002	0.007	
EPA 8270 - SV	alpha- BHC	319846	ND	
EPA 8270 - SV	Anilazine	101053	100	
EPA 8270 - SV	Aniline	62533	ND	
EPA 8270 - SV	Anthracene	120127	10	
EPA 8270 - SV	Aramite	140578	20	
EPA 8270 - SV	Aroclor 1260	11096825	ND	
EPA 8270 - SV	Aroclor 1221	11104282	ND	
EPA 8270 - SV	Aroclor 1232	11141165	ND	
EPA 8270 - SV	Aroclor 1242	53469219	ND	
EPA 8270 - SV	Aroclor 1248	12672296	ND	
EPA 8270 - SV	Aroclor 1016	12674112	ND	
EPA 8270 - SV	Aroclor 1254	11097691	ND	
EPA 8270 - SV	Azinophos methyl	86500	100	
EPA 8270 - SV	Barban	101279	200	
EPA 8270 - SV	Benzidine	92875	44	
EPA 8270 - SV	Benzo(a)anthracene	56553	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	Benzo(a)pyrene	50328	10	
EPA 8270 - SV	Benzo(b)fluoranthene	205992	10	
EPA 8270 - SV	Benzo(g,h,i)perylene	191242	10	
EPA 8270 - SV	Benzo(k)fluoranthene	207089	10	
EPA 8270 - SV	Benzoic acid	65850	50	
EPA 8270 - SV	Benzyl alcohol	100516	20	
EPA 8270 - SV	beta- BHC	319857	4.2	
EPA 8270 - SV	Bis(2-chloroethoxy)methane	111911	10	
EPA 8270 - SV	Bis(2-chloroethyl)ether	111444	10	
EPA 8270 - SV	Bis(2-chloroisopropyl)ether	108601	10	
EPA 8270 - SV	Bis(2-ethylhexyl)phthalate	117817	10	
EPA 8270 - SV	Bromoxynil	1689845	10	
EPA 8270 - SV	Butyl benzyl phthalate	85687	10	
EPA 8270 - SV	Captafol	2425061	20	
EPA 8270 - SV	Captan	133062	50	
EPA 8270 - SV	Carbaryl	63252	10	
EPA 8270 - SV	Carbofuran	1563662	10	
EPA 8270 - SV	Carbophenothion	786196	10	
EPA 8270 - SV	Chlordane	57749	0.14	
EPA 8270 - SV	Chlorfenvinphos	470906	20	
EPA 8270 - SV	Chlorobenzilate	501156	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	Chrysene	218019	10	
EPA 8270 - SV	Coumaphos	56724	40	
EPA 8270 - SV	Crotoxyphos	7700176	20	
EPA 8270 - SV	delta-BHC	319868	3.1	
EPA 8270 - SV	Di-n-butyl phthalate	84722	10	
EPA 8270 - SV	Diallate (cis or trans)	2303164	10	
EPA 8270 - SV	Dibenzo(a,e)pyrene	192654	10	
EPA 8270 - SV	Dibenzo(a,h)anthracene	53703	10	
EPA 8270 - SV	Dibenzo(a,j)acridine	224420	10	
EPA 8270 - SV	Dibenzofuran	132649	10	
EPA 8270 - SV	Dichlorovos	62737	10	
EPA 8270 - SV	Dicrotophos	141662	10	
EPA 8270 - SV	Dieldrin	60571	2.5	
EPA 8270 - SV	Diethyl phthalate	84662	10	
EPA 8270 - SV	Diethyl sulfate	64675	100	
EPA 8270 - SV	Diethylstilbestrol	56531	20	
EPA 8270 - SV	Dimethoate	60515	20	
EPA 8270 - SV	Dimethyl phthalate	131113	10	
EPA 8270 - SV	Dinoseb	88857	20	
EPA 8270 - SV	Diphenylamine	122394	ND	
EPA 8270 - SV	Disulfoton	298044	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	Endosulfan sulfate	1031078	5.6	
EPA 8270 - SV	Endosulfan I	959988	ND	
EPA 8270 - SV	Endosulfan II	33213659	ND	
EPA 8270 - SV	Endrin ketone	53494705	ND	
EPA 8270 - SV	Endrin aldehyde	7421934	ND	
EPA 8270 - SV	Endrin	72208	ND	
EPA 8270 - SV	EPN	2104645	10	
EPA 8270 - SV	Ethion	563122	10	
EPA 8270 - SV	Ethyl carbamate	51796	50	
EPA 8270 - SV	Ethyl methanesulfonate	62500	20	
EPA 8270 - SV	Famphur	52857	20	
EPA 8270 - SV	Fensulfothion	115902	40	
EPA 8270 - SV	Fenthion	55389	10	
EPA 8270 - SV	Fluoranthene	206440	10	
EPA 8270 - SV	Fluorene	86737	10	
EPA 8270 - SV	gamma- BHC (Lindane)	58899	ND	
EPA 8270 - SV	Heptachlor Epoxide	1024573	2.2	
EPA 8270 - SV	Heptachlor	76448	1.9	
EPA 8270 - SV	Hexachlorobenzene	118741	10	
EPA 8270 - SV	Hexachlorobutadiene	77744	10	
EPA 8270 - SV	Hexachlorocyclopentadiene	77744	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	Hexachloroethane	67721	10	
EPA 8270 - SV	Hexachlorophene	70304	50	
EPA 8270 - SV	Hexachloropropene	1888717	10	
EPA 8270 - SV	Hexamethylphosphoramide	680319	20	
EPA 8270 - SV	Indeno(1,2,3-cd)pyrene	193395	10	
EPA 8270 - SV	Isodrin	465736	20	
EPA 8270 - SV	Isophorone	78591	10	
EPA 8270 - SV	Isosafrole	120581	10	
EPA 8270 - SV	Kepone	143500	20	
EPA 8270 - SV	Leptophos	21609905	10	
EPA 8270 - SV	Malathion	121755	50	
EPA 8270 - SV	Mestranol	72333	20	
EPA 8270 - SV	Methapyrilene	91805	100	
EPA 8270 - SV	Methoxychlor	72435	10	
EPA 8270 - SV	Methyl methanesulfonate	66273	10	
EPA 8270 - SV	Mevinphos	7786347	10	
EPA 8270 - SV	Mexacarbate	315184	20	
EPA 8270 - SV	Mirex	2385855	10	
EPA 8270 - SV	Monocrotophos	6923224	40	
EPA 8270 - SV	n- Nitrosomethylethylamine	10595956	20	
EPA 8270 - SV	n- Nitrosodimethylamine	62759	ND	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8270 - SV	n- Nitrosodiphenylamine	86306	10	
EPA 8270 - SV	n- Nitrosodi-n-propylamine	621647	10	
EPA 8270 - SV	n- Nitrosodiethylamine	55185	20	
EPA 8270 - SV	n- Nitrosodi-n-butylamine	924163	10	
EPA 8270 - SV	n- Nitrosopiperidine	100754	20	
EPA 8270 - SV	n- Nitrosopyrolidine	930552	40	
EPA 8270 - SV	Naled	300765	20	
EPA 8270 - SV	Naphthalene	91203	10	
EPA 8270 - SV	Nicotine	54115	20	
EPA 8270 - SV	Nitrobenzene	98953	10	
EPA 8270 - SV	Nitrofen	1836755	20	
EPA 8270 - SV	Nitroquinoline-1-oxide	56575	40	
EPA 8270 - SV	o- Demeton	298033	10	
EPA 8270 - SV	o- Anisidine	90040	10	
EPA 8270 - SV	Octamethyl pyrophosphoramide	152169	200	
EPA 8270 - SV	o,o,o-Triethyl phosphorothioate	126681	ND	
EPA 8270 - SV	p- Dimethylaminoazobenzene	60117	10	
EPA 8270 - SV	p- Aminoazobenzene	60093	10	
EPA 8270 - SV	p- Cresidine	120718	10	
EPA 8270 - SV	p-Benzoquinone	106514	10	
EPA 8270 - SV	Parathion methyl	298000	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (ug/L)	USEPA MCL (ug/L)
EPA 8270 - SV	Parathion	56382	10	
EPA 8270 - SV	PCNB	82688	20	
EPA 8270 - SV	PCP	87865	50	
EPA 8270 - SV	Pentachlorobenzene	608935	10	
EPA 8270 - SV	Phenacetin	62442	20	
EPA 8270 - SV	Phenanthrene	85018	10	
EPA 8270 - SV	Phenobarbital	50066	10	
EPA 8270 - SV	Phenol	108952	10	
EPA 8270 - SV	Phorate	298022	10	
EPA 8270 - SV	Phosalone	2310170	100	
EPA 8270 - SV	Phosmet	732116	40	
EPA 8270 - SV	Phosphamidon	13171216	100	
EPA 8270 - SV	Phthalic anhydride	85449	100	
EPA 8270 - SV	Piperonyl sulfoxide	120627	100	
EPA 8270 - SV	Pronamide	23950585	10	
EPA 8270 - SV	Propylthiouracil	51525	100	
EPA 8270 - SV	Pyrene	129000	10	
EPA 8270 - SV	Pyridine	110861	ND	
EPA 8270 - SV	Resorcinol	108463	100	
EPA 8270 - SV	Ronnel	299843	0.3	
EPA 8270 - SV	s- Demeton	126750	10	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL ($\mu g/L$)	USEPA MCL ($\mu g/L$)
EPA 8270 - SV	Safrole	94597	10	
EPA 8270 - SV	Stirofos	22248799	ND	
EPA 8270 - SV	Strychnine	57249	40	
EPA 8270 - SV	Sulfallate	95067	10	
EPA 8270 - SV	TEPP	107493	40	
EPA 8270 - SV	Terbufos	13071799	20	
EPA 8270 - SV	Thiophenol	108985	20	
EPA 8270 - SV	Toluene diisocyanate	584849	100	
EPA 8270 - SV	Toxaphene	8001352	ND	
EPA 8270 - SV	Tri-p-tolyl phosphate	78320	10	
EPA 8270 - SV	Trifluralin	1582098	10	
EPA 8270 - SV	Trimethyl phosphate	512561	10	
EPA 8270 - SV	Tris(2,3-dibromopropyl) phosphate	126727	200	
EPA 8315	Acetaldehyde	75070	171	
EPA 8315	Formaldehyde	50000	7.2	
EPA 8316	Acrolein	107028	30	
EPA 8316	Acrylamide	79061	10	
EPA 8316	Acrylonitrile	107131	20	
EPA 8318	3-Hydroxycarbofuran	16655826	2.6	
EPA 8318	Aldicarb (Temik)	116063	9.4	
EPA 8318	Aldicarb Sulfone	1646884	1.9	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8318	Carbaryl (Sevin)	63252	1.7	
EPA 8318	Carbofuran (Furadan)	1563662	2	
EPA 8318	Dioxacarb	6988212	2.2	
EPA 8318	Methiocarb (Mesurol)	2032657	3.1	
EPA 8318	Methomyl (Lannate)	16752775	1.7	
EPA 8318	Promecarb	2631370	2.5	
EPA 8318	Propoxur (Baygon)	114261	2.4	
EPA 8321	Asulam	3337711	ND	
EPA 8321	Caffeine	58082	ND	
EPA 8321	Coumarin Dyes		ND	
EPA 8321	Dichlorvos	62737	0.040	
EPA 8321	Dimethoate	60515	0.020	
EPA 8321	Disperse Orange 30	5261314	ND	
EPA 8321	Disperse Red 1	2872528	ND	
EPA 8321	Disperse Brown 1	17464914	ND	
EPA 8321	Disperse Blue 3	2475469	ND	
EPA 8321	Disperse Red 13	2832408	ND	
EPA 8321	Disperse Blue 14	2475447	ND	
EPA 8321	Disperse Yellow 5	643953	ND	
EPA 8321	Disperse Red 5	3180812	ND	
EPA 8321	Disperse Orange 3	730405	ND	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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METHOD	CHEMICAL	CASRN	METHOD MDL (µg/L)	USEPA MCL (µg/L)
EPA 8321	Disperse Red 60	17418585	ND	
EPA 8321	Disulfoton	298044	0.010	
EPA 8321	Famphur	52857	ND	
EPA 8321	Fensulfothion	115902	0.004	
EPA 8321	Fluorescent Brightener 61	8066055	ND	
EPA 8321	Fluorescent Brightener 236	63590170	ND	
EPA 8321	Merphos	150505	0.010	
EPA 8321	Methomyl	16752775	ND	
EPA 8321	Methyl parathion	298000	0.300	
EPA 8321	Monocrotophos	919448	ND	
EPA 8321	Naled	300765	0.002	
EPA 8321	Phorate	298022	0.020	
EPA 8321	Solvent Red 23	85869	ND	
EPA 8321	Solvent Red 3	6535428	ND	
EPA 8321	Strychnine	57249	ND	
EPA 8321	Thiofanox	39196184	ND	
EPA 8321	Trichlorofon	52686	ND	
EPA 8321	Tris-(2,3-Dibromopropyl) phosphate, (Tris-BP)	126727	33000	
EPA 8330	1,3-Dinitrobenzene	99650	4	
EPA 8330	1,3,5-Trinitrobenzene	99354	7.3	
EPA 8330	2,4-Dinitrotolune	121142	5.7	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL (µg/L)**	**USEPA MCL (µg/L)**
EPA 8330	2,4,6-Trinitrotoluene	118967	6.9	
EPA 8330	2,6-Dinitrotolune	606202	9.4	
EPA 8330	Hexahydro-1,3,5-trinitro-1,3,5-triazine	121824	14	
EPA 8330	m-Nitrotoluene	99081	7.9	
EPA 8330	Methyl-2,4,6-trinitrophenylnitramine	479458	44	
EPA 8330	Nitrobenzene	98953	ND	
EPA 8330	o-Nitrotoluene	88722	12	
EPA 8330	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691410	13	
EPA 8330	p-Nitrotoluene	99990	8.5	
EPA 8331	Tetrazene	31330639	7	
EPA 9010A	Cyanide (soil)	57125	20 ug/kg	
EPA 9010A	Cyanide (liquid)	57125	20	
EPA 9020	Total Organic Halides (TOX)	TOX	5	
EPA 9030	Sulfide (soil)	1849625	0.3 mg/l	
EPA 9030	Sulfide (liquid)	1849625	0.3 mg/l	
EPA 9031	Sulfide (Extractable) {soil}	1849625	1 mg/kg	
EPA 9040	pH	PH	+or- .1 unit	
EPA 9041	pH (paper method)	PH	N/A	
EPA 9095	Filter Paper Test (pH)	PH	N/A	
EPA 600/4-81-045	Aroclor 1221	111074282		
EPA 600/4-81-045	Aroclor 1260	11096825		

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

METHOD	**CHEMICAL**	**CASRN**	**METHOD MDL ($\mu g/L$)**	**USEPA MCL ($\mu g/L$)**
EPA 600/4-81-045	Aroclor 1016	12674112		
EPA 600/4-81-045	Aroclor 1232	11141165		
EPA 600/4-81-045	Aroclor 1242	53469219		
EPA 600/4-81-045	Aroclor 1248	12672296		
EPA 600/4-81-045	Aroclor 1254	11097691		
NY APC-44	Total Glycols	GLYCOLT	50.	

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
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P = Polyethylene

Abbreviations	
a	In addition, MCL and MCLG for total nitrate and nitrite is 10 mg/L measured as nitrogen.
MCL	Maximum contaminant level
mg/L	Milligrams per liter
NPDWR	National Primary Drinking Water Regulations
NSDWR	National Secondary Drinking Water Regulations
MDL	Maximum detection level
PM	Promulgated criterion
SDWA	Safe Drinking Water Act
SMCL	Secondiary maximum contaminant level
TDS	Total dissolved solids
µg/L	Microgram per Liter

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

Radionuclide Sample Collection Information

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
CWA (NPDES) Note 1	4 liter plastic	None	N/A
SDWA Note 1	4 liter plastic	5 ml concentrated Nitric Acid pH <2	N/A if preserved
Radon Note 2	See Note 3	None. Ship immediately.	2 Days *

* Any questions regarding radionuclide sampling/Analysis, Please call (210) 536-2061, DSN 240-2061.
Note 1: Call lab for sample containers.
Note 2: Radon requires special containers.
Note 3: See Radiation Related Services Section in Appendix A, Para 3.e.

Note 1: SM = Standard Methods
Note 2: Not applicable to solid matrices.
G = Glass
P = Polyethylene

SAFE DRINKING WATER ACT (SDWA) RADIONUCLIDE DETECTION/REGULATORY LIMITS

METHOD	CHEMICAL	METHOD MDL (pCi/L)	MCLG	MCL
703	Gross Alpha	3	Zero	5 pCi/L
703	Gross Beta	3	Zero	4 mrem/yr EDE
711A	Uranium *	5	Zero	N/A
706	Radium 226	1	Zero	3 pCi/L
707	Radium 228	1	Zero	5 pCi/L
707	Radon 222		Zero	N/A
704	Strontium 89/90		Zero	4 mrem/yr EDE
901.1	I-131		Zero	4 mrem/yr EDE
901.1	Photon Emitters		Zero	4 mrem/yr EDE

* Method 711A is on file with USEPA as an accepted, alternate method.
** EDE = Effective Dose Equivalent

Quick Reference Tables

CONTAMINANTS REGULATED UNDER SDWA

CHEMICAL	MCLG (mg/L)	MCL (mg/L)
Flouride*	4.0	4.0
Volatile Organics		
Trichloroethylene	zero	0.005
Carbon Tetrachloride	zero	0.005
1,1,1-Trichloroethane	0.2	0.2
1,2-Dichloroethane	zero	0.005
Vinyl Chloride	zero	0.002
Benzene	zero	0.005
p-Dichlorobenzene	0.075	0.075
1,1-Dichloroethylene	0.007	0.007
Coliform & Surface Water Treatment		
Total Coliform*	zero	<5%+
Turbidity*	N/A	TT
Giardia lamblia	zero	TT
Viruses	zero	TT
Standard plate count	N/A	TT
Legionella	N/A	TT
Phase II		
Tetrachloroethlylene	zero	0.005
Chlorobenzene	0.1	0.1
trans-1,2-Dichloroethylene	0.1	0.1
cis-1,2-Dichloroethylene	0.07	0.07
o-Dichlorobenzene	0.6	0.6
Barium*	2	2
Cadmium*	0.005	0.005
Chromium* (total)	0.1	0.1
Mercury* (inorganic)	0.002	0.002
Nitrate*	10	10
Selenium*	0.05	0.05
Asbestos (fiber >10 um/L)	7 MFL	7 MFL
Lindane*	0.0002	0.0002
Methoxychlor*	0.04	0.04
Toxaphene*	zero	0.003
2,4-D*	0.07	0.07
2,4,5-TP	0.05	0.05
Aldicarb	0.001	0.003
Chlordane	zero	0.002
Carbofuran	0.04	0.04
Alachlor	zero	0.002
Epichlorohydrin	zero	TT
Toluene	1	1
PCBs	zero	0.0005
Atrazine	0.003	0.003
Acrylamide	zero	TT
Dibromochloropropane (DBCP)	zero	0.0002
1,2-Dichloropropane	zero	0.005
Pentachlorophenol	zero	0.001
Ethylene dibromide (EDB)	zero	0.00005
Xylenes (total)	10	10
Removed from Initial Phase II List		
Silver*		
Aluminum		
Molybdenum		
Vanadium		

CONTAMINANTS REGULATED UNDER SDWA (cont'd)

CHEMICAL	MCLG (mg/L)	MCL (mg/L)
Sodium		
Zinc		
Dibromomethane		
Added Phase II Contaminants		
Ethylbenzene	0.7	0.7
Styrene	0.1	0.1
Heptachlor	zero	0.0004
Heptachlor epoxide	zero	0.0002
Nitrite	1	1
Aldicarb sulfoxide	0.001	0.004
Aldicarb sulfone	0.001	0.002
Lead and Copper		
Lead*	zero	TT*
Copper	1.3	TT**
Phase V		
Dichloromethane	zero	0.005
(1,2,4-)Trichlorobenzene	0.07	0.07
Hexachlorobenzene	zero	0.001
Antimony	zero	0.006
Nickel	0.1	0.1
Thallium	0.0005	0.002
Beryllium	0.004	0.004
Cyanide	0.2	0.2
Endrin*	0.002	0.002
Dalapon	0.2	0.2
Diquat	0.1	0.1
Endothall	0.1	0.1
Glyphosate	0.7	0.7
Adipates (di(2-ethylhexyl)adipate)	0.4	0.4
2,3,7,8-TCDD (Dioxin)	zero	0.00000003
1,1,2-Trichloroethane	0.003	0.005
Oxamyl (Vydate)	0.2	0.2
Simazine	0.004	0.004
PAHs (benzo(a)pyrene)	zero	0.0002
Phthalates (di(2-ethylhexyl)phthalate)	zero	0.006
Picloram	0.5	0.5
Dinoseb	0.007	0.007
Hexachlorocyclopentadiene	0.05	0.05
Radionuclides (Proposed)		
Radium 226*	zero	20 pCi/L
Radium 228*	zero	20 pCi/L
Beta particle and photon radioactivity*	zero	4 mrem/yr
Uranium	zero	30 pCi/L
Gross alpha particle activity*	zero	15 pCi/L
Radon	zero	300 pCi/L
Sulfate (Proposed)		
Sulfate	400/500	400/500
Arsenic (interim)		
Arsenic*		0.05
Disinfection By-Products (interim)		
Total Trihalomethanes		0.10

CONTAMINANTS REGULATED UNDER SDWA

CHEMICAL	MCLG (mg/L)	MCL (mg/L)	CHEMICAL	MCLG (mg/L)	MCL (mg/L)
Flouride*	4.0	4.0	Sodium		
Volatile Organics			Zinc		
Trichloroethylene	zero	0.005	Dibromomethane		
Carbon Tetrachloride	zero	0.005	**Added Phase II Contaminants**		
1,1,1-Trichloroethane	0.2	0.2	Ethylbenzene	0.7	0.7
1,2-Dichloroethane	zero	0.005	Styrene	0.1	0.1
Vinyl Chloride	zero	0.002	Heptachlor	zero	0.0004
Benzene	zero	0.005	Heptachlor epoxide	zero	0.0002
p-Dichlorobenzene	0.075	0.075	Nitrite	1	1
1,1-Dichloroethylene	0.007	0.007	Aldicarb sulfoxide	0.001	0.004
Coliform & Surface Water Treatment			Aldicarb sulfone	0.001	0.002
Total Coliform*	zero	<5%+	**Lead and Copper**		
Turbidity*	N/A	TT	Lead*	zero	TT*
Giardia lamblia	zero	TT	Copper	1.3	TT**
Viruses	zero	TT	**Phase V**		
Standard plate count	N/A	TT	Dichloromethane	zero	0.005
Legionella	N/A	TT	(1,2,4-)Trichlorobenzene	0.07	0.07
Phase II			Hexachlorobenzene	zero	0.001
Tetrachloroethlylene	zero	0.005	Antimony	zero	0.006
Chlorobenzene	0.1	0.1	Nickel	0.1	0.1
trans-1,2-Dichloroethylene	0.1	0.1	Thallium	0.0005	0.002
cis-1,2-Dichloroethylene	0.07	0.07	Beryllium	0.004	0.004
[1]o-Dichlorobenzene	0.6	0.6	Cyanide	0.2	0.2
Barium*	2	2	Endrin*	0.002	0.002
Cadmium*	0.005	0.005	Dalapon	0.2	0.2
Chromium* (total)	0.1	0.1	Diquat	0.1	0.1
Mercury* (inorganic)	0.002	0.002	Endothall	0.1	0.1
Nitrate*	10	10	Glyphosate	0.7	0.7
Selenium*	0.05	0.05	Adipates		
Asbestos (fiber >10 um/L)	7 MFL	7 MFL	(di(2-ethylhexyl)adipate)	0.4	0.4
Lindane*	0.0002	0.0002	2,3,7,8-TCDD (Dioxin)	zero	0.00000003
Methoxychlor*	0.04	0.04	1,1,2-Trichloroethane	0.003	0.005
Toxaphene*	zero	0.003	Oxamyl (Vydate)	0.2	0.2
2,4-D*	0.07	0.07	Simazine	0.004	0.004
2,4,5-TP	0.05	0.05	PAHs (benzo(a)pyrene)	zero	0.0002
Aldicarb	0.001	0.003	Phthalates		
Chlordane	zero	0.002	(di(2-ethylhexyl)phthalate)	zero	0.006
Carbofuran	0.04	0.04	Picloram	0.5	0.5
Alachlor	zero	0.002	Dinoseb	0.007	0.007
Epichlorohydrin	zero	TT	Hexachlorocyclopentadiene	0.05	0.05
Toluene	1	1	**Radionuclides (Proposal)**		
PCBs	zero	0.0005	Radium 226*	zero	20 pCi/L
Atrazine	0.003	0.003	Radium 228*	zero	20 pCi/L
Acrylamide	zero	TT	Beta particle and photon		
Dibromochloropropane (DBCP)	zero	0.0002	radioactivity*	zero	4 mrem/yr
1,2-Dichloropropane	zero	0.005	Uranium	zero	0.02
Pentachlorophenol	zero	0.001	Gross alpha particle activity*	zero	15 pCi/L
Ethylene dibromide (EDB)	zero	0.00005	Radon	zero	300 pCi/L
Xylenes (total)	10	10	**Sulfate (Proposed)**		
Removed from Initial Phase II List			Sulfate	400/500	400/500
Silver*			**Arsenic (Interim)**		
Aluminum			Arsenic*		0.05
Molybdenum			**Disinfection By-Products (Interim)**		
Vanadium			Total Trihalomethanes		0.10

* Indicates original contaminants with Interim standards which have or will be revised.
[1]Not on list of 83.
[2]Action Level = 0.015mg/L.
[3]Action Level = 1.3 mg/L.
TT = Treatment technique requirement.

SDWA PHASE II & V - PESTICIDES SAMPLING INFORMATION
COLLECTION METHODS FOR 500 SERIES

METHOD	SAMPLE COLLECTION	PRESERVATION	HOLDING TIMES
EPA 504 (EDB/DBCP)	40ml glass teflon lined septum screwcap- NO AIR BUBBLES	If Chlorinated, add 3mg Sodium Thiosulfate	14 days
EPA 505 (Organochloride & PCB)	40ml glass teflon lined septum screwcap- NO AIR BUBBLES	If Chlorinated, add 3mg Sodium Thiosulfate	7 days
EPA 507 (Nitrogen/Phosphorous)	1 Liter glass bottle/Teflon lined screwcap	If Chlorinated, add 60mg Sodium Thiosulfate	14 days/23 days.
EPA 508 (Organochlorine & PCB)	1 Liter glass bottle w/ Teflon lined screwcap	If Chlorinated, add 80mg Sodium Thiosulfate	7days/21 days
EPA 508A (PCB Confirmation)	1 Liter glass bottle w/ Teflon lined screwcap	None	14 days/44 days
EPA 515.1 (Herbicides)	1 Liter glass bottle w/ Teflon lined screwcap	If Chlorinated, add 80mg Sodium Thiosulfate	14 days/28 days
EPA 525 (Semi-Volatiles) GC/MS	1 Liter glass bottle w/ Teflon lined screwcap	If Chlorinated, add 50mg Sodium Sulfite to pH <2 with 6 Normal Hydrochloric Acid	7 days/30 days
EPA 531.1 (Carbamates)	40ml glass teflon lined septum screwcap- NO AIR BUBBLES	If Chlorinated, add 3mg pH to 3 with 1.2ml Monochloroacetic Acid	28 days
EPA 506 (Phthalates)	1 Liter brown glass bottle w/ Teflon lined screwcap	If Chlorinated, add 60mg "LS" Sodium Thiosulfate	14 days/28 days
EPA 1613 (Dioxin-TCDD)	1 Liter brown glass bottle w/ Teflon lined screwcap	None	90 days/130 days
EPA 547 (Glyphosate)	2 x 40ml glass teflon lined septum screwcap- NO AIR BUBBLES	If Chlorinated, add 4mg Sodium Thiosulfate	14 days/18 months if frozen
EPA 548 (Endothall)	2 x 40ml brown glass teflon lined septum screwcap- NO AIR BUBBLES	None	7 days/8 days
EPA 549 (Diquat/Paraquat)	1 Liter brown PVC(Polyvinylchloride) high density bottle with screw cap	If Chlorinated, add 100mg Sodium Thiosulfate "LS"to pH <2 with Sulfuric Acid	7 days /28 days
EPA 550.1 (PNA/PAH)	1 Liter brown glass bottle w/ Teflon lined screwcap	If Chlorinated, add 100mg Sodium Thiosulfate "LS"to pH <2 with 6N Hydrochloric Acid	7 days/47 days
EPA 551 (Disinfection Byproducts)	2 x 40ml glass teflon lined septum screwcap- NO AIR BUBBLES	4mg Ammonium Chloride completely dissolved; pH 4.5-5.0 with 0.1N Hydrochloric Acid	14 days
EPA 551 (Chloral Hydrate)	40ml glass teflon lined septum screwcap- NO AIR BUBBLES	40mg Sodium Sulfite	14 days
EPA 552 (Disinfectant Byproducts)	120ml brown glass w/ teflon lined screwcap	10mg Ammonium Chloride 'LS'	28 days/30 days

* Keep all samples at 4 degrees Centigrade from time of collection. Ship on ice by overnight express (except Dioxin, 40-90 degrees Fahrenheit-room temperature.)

Useful References

1. Resource Conservation and Recovery Act (RCRA)
   - Ground Water Protection - 40 CFR 264.90-264.109
   - Ground Water Monitoring - 40 CFR 265.90-265.94
   - Tanks - 40 CFR.190-264.200, 265.190-265.199
   - Landfills - 40 CFR 264.300-264.339, 265.300-265.316
   - Incinerators - 40 CFR 264.340-264.999, 265.340-265.369
   - Dioxin Containing Wastes - 50 CFR 1978
   - Radioactive Wastes - 10 CFR Parts 10,20,40,60,61,72,960,961.
   - Disposal of Dredge or Fill Material - 40 CFR Parts 230.404, 231.404

2. Safe Drinking Water Act (SDWA)
   - Maximum Contaminant Levels - 40 CFR 141.11-141.16

3. Clean Water Act (CWA)
   - Requirements – 40 CFR 131.400-469

4. Toxic Substances Control Act (TSCA)
   - PCB General Requirements - 40 CFR 761
   - Container Markings - 40 CFR 761.40-45
   - Storage and Disposal - 40 CFR 761.60-79
   - Records and Reports - 40 CFR 761.180-185
   - TCDD Disposal - 40 CFR 775.180-197

5. Clean Air Act (CAA)
   - National Ambient Air Standards - 40 CFR 50.6, 50.7, 50.9
   - Radionuclides Air Pollutants - 40 CFR 61, 10 CFR 20.101-108

6. D.O.T. Rules for Transportation
   - Hazardous Materials 49 CFR Parts 107, 171.1-171.500

7. Sampling and Analysis
   - Standard Methods For The Examination of Water and Wastes, 17th Ed., APHA, 1015 15th St, N.W., Washington, D.C.
   - EPA Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.
   - EPA Handbook for Sampling and Sample Preservation of Water AND Wastes, EPA 600/4-82-029.
   - EPA Test Methods for Evaluating Solid Wastes, SW 846, Physical/Chemical Methods, Volumes 1A-C, II

PUBLIC LAWS

UNITED STATES CODE

PL 96-510 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980

PL 99-499 Superfund Amendments and Reauthorization Act (SARA) of 1986

REGULATIONS

CODE OF FEDERAL REGULATIONS

40 CFR 136.3e, Table II Required Containers, Preservation Techniques, and Holding Times

40 CFR 136, Appendix A Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater

40 CFR 136, Appendix B Definition and Procedure for the Determination of the Method Detection Limit

40 CFR 136, Appendix C Inductively Coupled Plasma–Atomic Emission Spectometric Method for Trace Elements Analysis of Water and Wastes Method 200.7

40 CFR 300.61-300.81 National Contingency Plan

FEDERAL REGISTER

Federal Register, Toxixity Characterization Leachate Procedure, Volume 55, No. 126, 29 June 1990 Characteristic Learning Procedure

PRESIDENTIAL DOCUMENTS

EXECUTIVE ORDERS (EOs)

EO 12088 Federal Compliance with Pollution Control Standards (13 Oct 1978)

EO 12580 Superfund Implementation (23 Jan 1987)

MANUAL

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA-330/9-S1-002 National Enforcement Investigations Center Manual for Ground Water/Subsurface Investigations at Hazardous Waste Sites

EPA-540/1-88-001 Office Superfund Exposure Assessment of Solid Waste and Emergency Response (OSWER) Manual (April 1988) Directive 9285.5-1

EPA-540/1-86-060, OSWER Risk Assessment Guidance for Directive 9285.7-01aSuperfund, Volume 1: Human Health Evaluation Manual (September 1989)

EPA-540/P87/001A, OSWER Superfund Compendium of Field Directive 9355.0-14Operation Methods (December 1987, Appendix E contains sources of Applicable or Relevant and Appropriate Requirements)

EPA-600/4-79-020 Methods for Chemical Analysis of Water and Wastes (1983)

SW-846 Test Methods for Evaluating Solid Waste, Third Edition (1986), and 1987 updates.

EPA-540/G-87/003a Data Quality Objectives for Remedial Response Activities: Volume 1, Development Process (March 1987) and Volume 2, Example Scenarios (March 1987)

EPA-600/4-82-029 Handbook for Sampling and Sample Preservation of Water and Waste Water, 1982.

American Public Health Association, Standard Methods for the Examination of Water and Waste Water, American Water Works Association and Water Pollution Control Federation 17th Edition (1992)

AMERICAN SOCIETY FOR TESTING AND MATERIALS

D-1452 Soil Investigation and Sampling by Auger Boring
D-1586 Penetration Test and Split-Barrel Sampling of Soils
D-2487 Unified Soil Classification System
D-2488 Recommended Practices for Visual-Manual Description of Soils
Annual Book of Water and Environmental StandardsTechnology (ASTM),Section 11

GUIDANCE DOCUMENTS, EPA

OSWER 9355.3-01 Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, October 1988
EPA 600/2-85/104 Practical Guide for Ground Water Sampling (September 1985)
OSWER 9950.1 RCRA Ground Water Monitoring Technical Enforcement Guidance Document (September 1986)
EPA 625/6-87/016 Handbook: Ground Water (March 1987)

GUIDANCE DOCUMENTS, OTHER

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
WR-153-87 Ground Water Sampling Procedures Guidelines (February 1987)
Guidelines for Monitoring Well Installation

MINNESOTA POLLUTION CONTROL AGENCY
Procedures for Ground Water Monitoring (December 1986)

STATE OF CALIFORNIA
Administrative Leaking Underground Fuel Tank Code, Title 22 Manual, Water Resources Control Board, Parts 66690-66700 (1986)

OTHER BOOKS AND JOURNAL ARTICLES

A Compendium of Superfund Field Operations Methods, Appendix 8.4, EPA/540/p.87/001, U.S. EPA, 1987

A Critique of the Hvorslev Method for Slug Test Analysis: The Fully Penetrating Well, Ground Water Monitoring Review, Vol. 9, p. 130-138, Chirlin, G.R., 1989

Analysis and Evaluation of Pumping Test Data, International Institute for Land Reclamation and Improvement, Bulletin 11, Wageningen, The Netherlands, Kruseman, G.P. and N.A. Ridder, 1970

Analytical Chemistry, Vol. 55, pp. 2210-2218, Principles of Environmental Analysis, December 1983.

Detection of Hydrocarbons in Ground Water by Analysis of Shallow Soil Gas/Vapor, B. Eklund, American Petroleum Institute Publication 4394, May 1985

Geophysical Techniques for Sensing Buried Water and Waste Migration, Benson, et al, National Water Well Association, 1982

Ground-Water Hydraulics, US Geological Survey Professional Paper 708, 1979

Log Interpretation Principles/Applications, 2nd Ed., 1331 Lamar, Houston, TX 77010, p. 198, Schlumberger Educational Services, 1987

On the Analysis of Slug Test Data, Water Resources Research, Vol. 9, p. 1087-1089, Papadopulas, I.S., J.D. Bredehoeft and H.H. Cooper, Jr., 1973

Practice for Thin-Wall Tube Sampling of Soils, ASTM D-1587

Proposed Sampling and Analytical Methodologies to Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, 3rd Edition, U.S. EPA, 1986
SW-9100, Saturated Hydraulic Conductivity, Saturated Leachate Conductivity, and Intrinsic Permeability Methods.

Test Method for Permeability, ASTM-D2434

Test Method For Determining Transmissivity and Storativity of Low Permeability Rocks by In-Situ Measurements Using the Constant Head Injection Test, ASTM D-4630

Test Method For Determining Transmissivity and Storativity of Low Permeability Rocks By In-Situ Measurements Using the Pressure Pulse Technique, ASTM D-4631

The Bouwer and Rice Slug Test - An Update, Ground Water, Vol. 27, p. 304-309, Bouwer, H., 1989

Water Measurement Manual, Bureau of Reclamation, 1967

Collection Hints from Lab of Pesticide and Trace Organic Samples

1.General Instructions

a. Freeing sample containers from interfering substances requires the use of acid baths, residue grade solvents, and high temperature muffle furnaces; items most BEE shops do not have. Even if they had them, the labor would be cost prohibitive. Therefore, we recommend that bases purchase precleaned bottles suitable for trace organic analysis. These are available from a number of sources including, but not limited to, the following suppliers.

i. Eagle-Picher Brand Sample Containers for Trace Organic Residues Precleaned using Protocol A, available from:

Baxter Diagnostics, Inc.
Scientific Products Division
1430 Waukegan Road
McGraw Park, Illinois 60085-6787
(708) 689-8410

ii. I-Chem Research Brand Sample Containers for Trace Organic Residues Precleaned using Protocol A, available from:

(1) Curtin Matheson Scientific, Inc.
P. O. Box 1546
Houston, Texas 77251-1546
(713) 820-9898

(2) Fisher Scientific
711 Forbes Avenue
Pittsburgh, PA 15219-4785
(412) 562-8300

(3) VWR Scientific
P. O. Box 5025
Sugar Land, Texas 77487
(713) 240-4700

b. Consult the table in appropriate section to determine the sample size and type of container required. Add the preservatives as directed in this table and mix well. Remember: Preservation may vary depending on the nature of the sample. For example, residual chlorine may need to be quenched in a chlorinated water sample. However, a sample taken at the well head before chlorination would not need such treatment.

c. Pack samples to prevent breakage during shipment, using bottle mailers containing polyurethane foam or styrofoam inserts sized to receive the bottles. Alternatively, individually wrap each sample in bubble wrap, completely enclosing the bottle. Ship on ice by overnight express. The samples must be received at 4°C. Samples received at room temperature will not be analyzed. Do not use dry ice because it will freeze the samples, breaking their bottles.

2. Collection of Oil Samples for PCB Analysis

a. To offer you the best possible turn around time on PCB oil samples, a robot prepares them. Unfortunately, robots work best at repetitive tasks, unlike humans who can adapt to nonroutine tasks. To maximize the through put of these samples, we request everyone collect oils for PCBs in the same style container.

b. Please collect your oil samples for PCB analysis in 20 mm O.D. X 150 mm long Pyrex brand culture tubes with 18-415 G.P.I. thread finish and teflon lined screw caps. Order these from

Corning Incorporated, Science Products, P. O. Box 5000, Corning, New York 14830, phone: (607) 974-4667, on GSA Contract No. GS-00F-2464A (12 January 1990 through 30 April 1995). The Corning catalog number is 9826-20X and the GSA code is 405925 9826. They are available in cases of 192 tubes for $158.97/case. The culture tubes must fit these dimensions exactly for the robot to use them. They must be glass tubes with teflon-lined screw caps so that the sample is not contaminated with plastics, rubber, or other organics.

c. To use these tubes on the robot, you must fill the tube 1/3 to 1/2 full of oil. Draw lines at 2 and 3 inches from the bottom of the tube and add oil until a level between these two lines is reached. We need this amount so that the robot can reach the sample, but not overflow the tube while pipetting. After filling the tube, tighten the screw cap by hand. Do not tape or otherwise seal the cap. Label the tube with the sample number using a Sharpie or other indelible marker. Do not use an adhesive-backed label on the tube. Adhesives must be avoided because they will adhere to the robot and keep it from operating properly. The tube should be sealed in a plastic bag to contain any spill resulting from leakage or breakage in shipment. This also prevents cross contamination of samples. The plastic bag may be labelled with either a Sharpie or an adhesive-backed label. Finally, the bagged tube should be packed in a styrofoam lined tube shipping container. If a tube shipping container is not available, the bagged tubes must be individually wrapped in bubble wrap to prevent breakage in shipment.

SAMPLING OF VOLATILE ORGANIC COMPOUNDS

1) The following applies to all water samples, potable and nonpotable (EPA method 502.2, 503.1, 502.1, 524.2, 601, 602, 624, 8260, 8020, 8010, 8015)

a. Collect the samples in triplicate (labeled A, B and C) using 40 ml. glass vials with teflon lined septa and screw caps. These precleaned vials can be ordered from Scientific Products, Fisher, BVA Scientific...etc. Their specification is 3.75" in length X 1.125" in diameter (equivalent to the Eagle Pitcher brand).The correct size vials is important since our autosamplers are designed to accept only this size.

b. If the water to be sampled has no free or combined chlorine proceed to c. If the water to be sampled has free or combined chlorine, add 3mg sodium thiosulfate or 25mg ascorbic acid for potable samples, or 10mg sodium thiosulfate for nonpotable samples (SEE PRESERVATION TABLES). Sodium thiosulfate or ascorbic acid addition prevents further formation of halogenated hydrocarbons after the sample has been collected. Care must be taken not to add too much sodium thiosulfate. Thiosulfate that is not consumed by the chlorine will react with the 1:1 Hydrochloric Acid (used in the next step) leading to the formation of sulfur dioxide which might interfere with the analysis.

c. Next the sample must be acidified to a pH < 2 with 1:1 Hydrochloric Acid in water. Approximately two drops of Hydrochloric Acid added to the sampling vial prior to collecting the sample should be sufficient. In order to test the adjustment, collect 40 ml. of the water to be sampled in an extra vial, and add two drops of 1:1 Hydrochloric Acid and test the solution with narrow range pH paper (1.4-2.8). One must be careful not to lower the pH too far. Too much acid will corrode the tubing in our autosamplers. This causes instrument downtime which might delay reporting of results.

d. Fill the vial until it begins to overflow, being careful not to allow air bubbles to pass through the sample. After the vial is full, place it on a level surface and add a little more sample. Place the TFE (thinner layer) side of the liner against the sample and tighten the cap. If the liner is inverted, AI/OEA must discard the sample, as significant loss of volatiles will result during shipment.

e. Invert the vial to insure that no air bubbles are entrapped in the sample. If an air bubble is present, add more sample and reseal the vial. If there are no air bubbles present, and a preservative has been added, shake the sample for one minute to mix the preservative and the sample.

f. Do not tape the cap or use excessive amounts of labeling on the vial since that interferes with our autosamplers. Using a water proof Sharpie to label the vials is preferable.

g. If samples contain detergents, annotate this information on the form. This will allow us to take the necessary precautions to prevent foaming which interferes with the operation of our equipment.

h. Composite samples for volatile organics must be mixed by AL/OEA. Send the individual samples in 40 ml.glass vials with clear directions for mixing.

i. Always send a blank with each group of samples and assign a number to it. Store the blanks with the samples. If blanks are not obtained from our laboratory, make sure to use distilled or deionized water,and indicate the source of water(e.g. a label or other discriptor).

2) Soil samples sent for volatile organics analysis (ie EPA 8015, 8010, 8020,8260,....) should be sent in a 4 oz. wide mouth jar with teflon or aluminum foil lined lid. Do not send soils in the 40 ml. vials. Pack in ice packs.

3) Sampling for Maximum Trihalomethane Potential (MTP), EPA method 510.1:

Maximum trihalomethane potential (MTP) is designed to test the potential for trihalomethane production on distribution systems serving less than 10,000 people, and using a halogenated disinfectant in the purification process. No preservative is added to "quench" the production of trihalomethanes at the time of collection. The purpose of this determination is to allow the chemical reaction to proceed until the maximum amount of trihalomethanes are produced in the water supply being tested.The production of trihalomethanes are affected by four parameters: pH, temperature, reaction time,and the presence of chlorine residual. Sampling procedure for this analysis are as follows:

a. Request the proper number of vials from AL/OEA. Collect 4 vials for each sample (labeled A, B, C and D), measuring the pH and temperature of each sample. Collect the samples at the point of maximum chlorination.

b. Measure the chlorine residual at the sampling point, and proceed with the sampling only if a measurable residual is present.

c. Blanks containing pretested water from the Laboratory will be sent along with the sampling vials. The blanks are to be returned with your samples to AL/OEA for analysis. Store the blanks with the samples.

d. Fill the vial until it begins to overflow, being careful not to allow air bubbles to pass through the sample. After the vial is full, place it on a level surface and add a little more sample. Place the TFE (thinner layer) side of the liner against the sample and tighten the cap. NOTE: If the liner is inverted, AL/OEA will discard the sample, as significant loss of volatiles will occur during shipment.

e. Invert the vial to insure that no air bubbles are entrapped in the sample. If an air bubble is present, add more sample and reseal the vial. When no air bubbles are present, store the vials together for seven days at 25 C (or higher). The storage area should be free of organic vapors. At the end of the seven days open one of the vials (vial D) and check for chlorine residual. If no chlorine residual exists, the analysis is invalid and the distribution system must be resampled.

f. If resampling is required, add one or two drops of chlorine solution to the vials to assure that there will be a chlorine residual after the seven days.(Continue the addition, dropwise, until a residual is demonstrated.) Once a chlorine residual has been demonstrated after the seven day period, add 3 mg sodium thiosulfate preservative to each of the remaining three vials. If air bubbles are present, add more sample from vial D and ship the samples packed in ice/freeze packs for MTP analysis.

g. MTP analysis is to be distinguished from TTHM. TTHM simply measures trihalomethanes that are present in the sample, while MTP measures the potential for additional trihalomethane production as a result of the presence of chlorine.

Sampling Guide Text for Fuel Characterization

Since fuel types (i.e., JP-4,JP-5...etc.) are defined by chemical and physical characteristics of the mixture rather than by composition, the chemical components and their proportions in a fuel type may vary from company to company and even lot to lot. While fuel samples of any particular type will have similar composition, the best identification is acheived by comparison to a neat sample of the same fuel (i.e., same manufacturer and same lot). Therefore, if at all possible send a neat sample of the fuel suspected to be in the sample. This neat sample should be taken from the storage tank from which the suspected contaminant came or a storage tank holding the same lot of fuel.

Fuel Characterization is a qualitative analysis and can only provide the identity of a fuel. If a quantitative result is required, request a Total Petroleum Hydrocarbon (TPH) analysis in addition to Fuel Characterization. Both analyses are performed on the same sample.

The sampling containers and amounts for Fuel Characterization are the same as those for the TPH analysis.
Collect 1 Liter in *Glass Only* and preserve with Sulfuric Acid to a pH <2.

FUEL CHARACTERIZATION

Avgas	Fuel Characterization
Diesel fuel	8015 California modified
Gasoline fuel	8015 California modified
JP-10	Fuel Characterization
JP-4	Fuel Characterization
JP-5	Fuel Characterization
Jp-7	Fuel Characterization
Jp-8	Fuel Characterization
Lube oil	Fuel Characterization
Mogas	Fuel Characterization

Corrosivity of Water

A Langelier Index is a mathematical means used to predict the corrosivity of water. The Langelier Index is a calculation based on five different analyses- alkalinity, calcium hardness, total dissolved solids (total filterable residue), pH and water temperature, and is a measure of water's ability to deposit or dissolve calcium carbonate. The measurement of pH and water temperature must be made on site immediately after collecting the sample.

Sampling for Water Quality

INTRODUCTION

The procedures and methods contained in this section are in compliance with the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) and other EPA regulations when applicable.

It is imperative that good sampling techniques be followed to insure that representative samples are sent to the Laboratory for analysis. Proper selection, collection, identification and shipment of samples must occur to ensure the reliability of all Air Force Environmental Monitoring Programs.

GOAL OF WATER SAMPLING

The goal of water sampling is to obtain results which accurately portray the ambient water quality. Since sampling is the major source of variability in any water analysis, samples must be obtained, preserved, and transported in such a way to ensure that the results meet Air Force goals as well as any regulatory requirements.

CONSIDERATIONS FOR A WATER QUALITY MONITORING PROGRAM.

The key element in a water quality monitoring program is the assurance of valid sampling data. No single sampling program can apply to all types of water, nevertheless, each sampling program must consider the following:

(a) Objective of Sampling.

(b) Location of Representative Sampling Points.

(c) Type of Samples.

(d) Proper Field Procedures.

(e) Quality Assurance

OBJECTIVE OF SAMPLING

1. The major objective of a sampling program is to fulfill the needs and the regulatory responsibilities of the Air Force. Specifically, the objective of a water quality sampling program are: 1) To establish trends, benchmarks, background levels; 2) To insure operation quality control; 3) Verification of compliance with enforceable water quality regulations.

2. A good sampling program should be designed to consider the quality of the data needed, and the degree to which total error must be controlled to achieve the required level of confidence. The data collection planning process should provide a logical, objective, and quantitative balance between the time and resources available for collecting the data and the required data quality based on its intended use.

LOCATING REPRESENTATIVE SAMPLING POINTS

1. Bioenvironmental Engineer Services (BES) at Air Force Installations should have a listing of their routine potable and non-potable sampling collection points. A map of the installation depicting all of the routine sample collection points should also be available.

2. The following considerations should be made when selecting a representative potable or non-potable sampling point:

(a) The Homogeneity of the Water or Wastewater

1. When selecting sampling points in a water distribution system, select points in the distribution system where conditions are well represented such as high pressure zones and water storage facilities. Dead end loop sampling should only be considered when asetheics, or other problems are encountered.

2. Ensure that each different water source entering the installation is sampled.

3. Attempt to distribute the sampling points uniformly through-out the system in both types of distribution system configurations (loops and branches). This should be done in proportion to the number of loops and branches. (Figures 1 & 2 illistrates possible sampling location distribution.

4. If the Installation maintains water storage tanks, sampling points should be located so that the water coming from the storage tanks can be sampled during time of high-demand.

5. When selecting sampling points at a stream or wastewater discharge, select a point where the flow is turbulent, well mixed, and the settling of the solids is minimal. At these locations, collect the samples from the center of the channel. Avoid skimming of the water surface or dragging the channel bottom.

6. Keep in mind, it's difficult to obtain a truly representative sample when collecting surface water samples. The best results can be obtained by running a series of tests with samples taken from several locations and depths at different times. Results can then used to establish patterns applicable to that particular body of water.

(b) The General Characteristics of the Water or Wastewater

Water quality characteristics are often classified as physical, chemical (organic and inorganic), or biological and can then further be classified as health related or aesthetic. Before locating a sampling point, determine the possible effects that a particular location may have on the water quality and your sample.

(c) Pronounced Water Quality Degradation

When establishing sampling locations, you must consider those critical areas which have the potential for displaying the most pronounced water quality or biological problems.

(d) Flow Measurement

Consider those locations where corresponding discharges are known or can be estimated.

(e) Convenience

Convenience, accessibility and practicability are certainly important but they must be secondary to representativeness of sampling.

TYPE OF SAMPLE

1. When sampling water matrices, the collector must have knowledge of the type of water being sampled, before determining the type of sample to take. The listing below shows the different types of water sources one might encounter. Many of these water types require special sampling procedures peculiar to that source:

(a) Surface water (rivers, lakes, artificial impoundments, runoff, etc.)

(b) Groundwater and springwaters.

(c) Wastewater (landfill leachate, industrial, and domestic effluents etc.)

(d) Saline, Estuarine, and Brine waters.

(e) Precipitation and Condensation.

(f) Process Water, Potable (drinking) Water, Glacial Melt, Steam, etc.

(g) Water from Subsurface Injection

2. The two methods of collecting water samples are the grab and composite methods. Either method can be done manually or with an automatic sampler. Whichever technique is used, the success of the sampling program is directly related to the care exercised in the sample collection process. When determining the type of sampling method, you should consider the following:

(a) The variability of flow.

(b) The variability of water, stream, or wastewater quality.

(c) The sampling accuracy required.

(d) The availability of funds.

3. Grab Sample. The definition of a grab sample is an individual discrete sample collected over a period of time not exceeding 15 minutes. It can be taken manually, using a pump, scoop, vacuum, or other suitable devices. Grab sampling should be considered when it is desired to:

(a) Characterize water quality at a particular time.

(b) Meet requirements of a discharge permit.

(c) Provide information about minimum and maximum concentrations.

(d) To present evidence in support of composite sampling.

(e) Allow collection of variable sample volume.

4. The following information will aid in selecting the appropriate situations for collecting grab samples:

(a) The stream does not flow continuously (e.g. batch process dumping).

(b) The water or waste characteristics are relatively constant.

(c) When parameters to be analyzed are likely to change when stored.

(d) The history of water quality is to be established based on short time intervals.

(e) The spatial parameter variability is to be determined, e.g., the parameter variability throughout the cross section and/or depth of a stream or large body of water.

5. Composite Sample. A composite sample is defined as one sample formed by mixing discrete samples taken at periodic points in time or continuous proportion of the flow. The number of discrete samples which make up the composite sample depends on the variability of the pollutants concentration and flow. A sequential composite sample is defined as a series of periodic grab samples each of which is held in an individual container, then composited to cover a longer time period.

6. The following information will aid in selecting the appropriate situation for collection of composite samples.

(a) Determining average concentrations.

(b) Calculating mass/unit time load.

(c) Permit requirement.

PROPER FIELD PROCEDURES

1. The key to a sampling program is field operation. If proper care is not exercised in the field procedures, the entire sampling program will become meaningless despite adequate planning, analytical facilities, and personnel. The following are the 4 key elements to a successful field sampling program:

(a) Good Housekeeping.

(b) Method of Collecting Representative Samples.

(c) Proper Handling and Preservation of Samples.

(d) Quality Assurance

A. Good Housekeeping

(1) Compose written instructions on field sampling procedures.

(2) Prior to use, check sampling equipment to insure good operating conditions and cleanliness.

(3) Check all sample bottles to avoid contamination.

(4) Maintain record of breakdowns in the sampling operations, theproblems encountered with the different equipment and how they were resolved.

(5) Hold training sessions for those individual(s) who perform sampling.

B. Method of Collecting Representative Samples

1. The following are guidelines to assure the integrity of collecting representative samples from a potable water tap source:

(a) Collect samples at faucets which are free of contaminanting devices such as screens, aeration devices, hoses, purification devices or swiveled faucets.

(b) Make sure faucet is clean; if the faucet is in a state of disrepair, select another sampling location.

(c) Collect samples in area free of excessive dust, rain, snow, or other sources of contamination.

(d) Collect samples from faucets which are high enough to place sampling container underneath, without contacting the mouth of the container with the faucet.

(e) Open faucet and thoroughly flush. Generally, 2 to 3 minutes will suffice, however, a longer times may be needed when collecting samples from a line containing lead. A stable water temperature is a good indicator of sufficient flushing.

(f) Upon completion of flushing, adjust the flow so it does not splash against the walls, sinks, or other surfaces prior to collecting the sample.

(g) For most samples, fill containers to one and a half inches from the top. For volatile samples, a special container is used. Sample container must be completely filled with no air bubbles.

(h) Adhere to sample handling requirements: preservation, temperature, and holding times.

2. Sampling from permitted locations such as storm water or effluent from wastewater treatment facilities is required by regulatory agencies for the National Permit Discharge Elimination System (NPDES) permit program. The location of sampling points, frequency, and sample type are specified in the NPDES permit.

3. The following guidelines will assure the integrity of collecting representative water samples taken from a permitted location:

(a) Ensure that all permitted sampling requirements are adhered to.

(b) Protocol A clean containers should be used when sampling from a site of regulatory importance.

(c) Unless otherwise specified by permit, ensure that liquid, not sediment is captured in sampling vessel.

(d) When using composite samplers the following should be considered:

(1) Sampler tubing should be cleaned or changed between sampling events.

(2) Ensure that proper composite container(s) are used, glass or polyethylene. Note: The proper determination of a composite container is made based on the adhering quality of the parameters being sampled, or specified by regulation.

(3) It is imperative when collecting a composite sample over a 24 hour period to maintain the sample at 4 degrees Celsius.

(e) When collecting samples with a grab sampling device, ensure that the device is constructed with materials which could not cause analytical interference with samples. Also, thoroughly clean device between sampling event.

(f) To make certain that your sampling equipment(e.g. wastewater sampler, bucket, etc..) did not cause cross-contamination problems, collect an equipment blank sample. (Note: An equipment blank is collected by pouring or pumping laboratory grade water in or through the sampling device).

4. The following are procedures to assure the integrity of collecting a representative sample from a monitoring well:

(a) Before sampling consider the following:

(1) Choose a sampling device which minimize the potential for altering the water quality of the sample.

(2) Withdraw samples shortly after purging (as soon as a volume of water sufficient for the intended analyses reenters the well).

(3) Sample the least contaminated well first, the more contaminated last (e.g. sample in increasing order of contamination). If the degree of contamination is unknown, sample upgradient wells first, the down gradient well last.

(4) Withdraw samples from within or just above the screened section of the well.

(b) Measure Water Level in a Well:

(1) Take a series of water level measurements to determine whether the well is still recovering. If you obtain at least three consecutive readings separated by a minimum of one minute interval that are within .01 foot, then use this value as your reading.

(a) Measure total well depth by performing the following:

(1) Measure total well depth with a weighted tape or weighted synthetic cord which has been calibrated in tenths of feet.

(2) Lower the tape or cord until it stops and record the length to the top of the casing.

(3) Record the depth to the nearest .1 foot.

(b) Measure casing depth:

(1) Use a weighted magnet system which clings to the casing to determine depths of steel casing.

(2) Lower the magnet by a marked cable along the casing until the magnet slips off the end.

(3) Measure and record the length to the top of the casing.

(c) The methods of purging a well:

(1) Wells that can be purged dry are typically those wells with well screen in low permeability formations.

(a) Pump/bail the well dry.

(b) Allow the well to recover after purging.

(c) If time permits, purge the well a second time.

(d) Collect the samples as soon as there is a sufficient volume of water for the intended analyses.

(2) Wells that cannot be purged dry, are those wells with well screen in high permeability formations.

(a) Remove four (4) well volumes. Note: Calculate well volume by using the equation below.

EQUATION: $V=[\pi \cdot (r^2) \cdot H] \times 4 \times 7.48$

WHERE:

V= Total volume of water needed to purge (gallon)

D= Inside diameter of well (ft)

H= Height of water column in well(ft)

(NOTE: Height is measured by subtracting depth of the water from depth form the bottom of the well)

(b) Purge wells by pumping or bailing from as near the the water surface as possible to ensure that no stagnant water remains.

(c) Attempts should be made to introduce as little air and turbulence into the formation as possible to prevent alteration of samples.

(d) Sampling a monitor well with a bailer:

(1) Rinse the bailer and line with reagent grade water.

(2) Place a large clean plastic bag or cloth material on the ground around the well to prevent the bailer from touching the ground.

(3) Lower the bailer slowly and gently into the well until it comes in contact with the water. (NOTE: Do not allow the bailer to free fall into the well. Do not allow the bailer to touch the bottom of the well).

(4) Attempt should be made to lower the bailer to the same depth in the well each time.

(5) Retrieve the bailer smoothly. Do not allow the bailer rope to touch the ground.

(6) In-field analyses such as conductivity, temperature or pH, should be accomplished immediately.

(7) Slowly pour samples in their respective containers

(8) Be aware you may be required to filter your samples prior to submitting them to the laboratory.

(e) Sampling a monitor well with a well pump:

(1) Rinse the pump and associated apparatus with laboratory grade water.

(2) Position the pump inlet in the well such that water is removed from the same portion of the well each time. (NOTE: Attempt to position the pump head or bailer within or just above the screen)

(3) Direct the samples into the containers in the same order as with a bailer

5. Proper Handling and Preservation of Samples.

The successful implementation of a sampling programs depends on the capability to produce valid data. The proper collection methods, preservation, storage and handling, and sample identifications procedures help insure the validity of the data.

(a) Maintaining a sampling log book.

Maintain a sampling log book to keep track of all environmental sampling. Record all information pertinent to a field survey or sampling in bound log book. As a minimum, include the following in the log book: purpose of sampling; location of sampling points; sample number; date and time of collection; the name of the individual(s) collecting samples; method of analyses requested; method preservation; date samples were submitted to laboratory. Because sampling situations vary, no general rule can be given as to the information to be entered in the log book. It is desirable to record sufficient information so that one could reconstruct the sampling event without relying on the collector's memory.

(b) Sample Identification.

Please label the sample bottles with indelible marker only (ie. "Sharpie"). Do not attach gummed labels because it interferes with the labs auto samplers and robotic equipment. Other pertinent information should be entered on the sampling form.

(c) Proper Containers

The type of sample containers used is of utmost importance. Containers are typically made of plastic or glass, but one material may be preferred over the other. For example, silica and sodium may be leached from glass but not plastic, and trace levels of metals may be absorbed onto the wall of glass containers. For samples containing organics, avoid plastic containers except those made of fluorinated polymers such as polytetrafluoroethylene (PTFE). Container failure due to breakdown of plastic is possible. Some organics are compatible with certain plastics. However, even if compatibility is assured, recognize that the walls of plastic container can be porous to volatile organics. Glass containers generally are perfered with volatile organics. Note, plastic container caps can also be a problem with organics. Use foil or PTFE liner. If using foil, the pH must be between 6 and 8.

(d) Sample Preservation

Preservation methods and maximum holding times associated with different analyses need to be taken into consideration to ensure proper analysis. Preservation of the samples is accomplished by pH control, chemical addition, temperature control or a combination of the above methods. The preservation of samples is required because immediate analysis of the samples is not feasible except for a few parameters (i.e., dissolved oxygen, pH, temperature, etc.). The preservation methods and recommended sample holding time should be checked before sampling for any analyte.

(e) Sample Storage

In general, the shorter the time that elapses between collection of samples and its analysis, the more reliable will be the analytical results. For certain constituents and physical values (e.g. temperature, pH). immediate analysis in the field is required. Remember to adhere to particular parameter storage requirements, typically, most samples require storage at 4°C

Quality Assurance

1. The sampling program should delineate the details on sampling locations, sample type, sample frequency, number of samples, duration of sampling, sample volume, sample type, sample collection methods and holding time, equipment used for sample collection, sample containers, pretreatment of containers, type and amount of preservative to be used, blanks, duplicates/triplicates, spiked samples, chain of custody procedures, and any other pertinent matters which will have bearing on the quality of sample collection and handling.

2. Procedures should be developed for routine testing, maintenance and calibration of sampling equipment.

3. Random control checks should be performed to make sure that appropriate sampling guidelines on sample collections and handling are being followed. Analytical quality control as an aid to quality assurance must be performed through duplicate, split, and spiked samples, sample preservative blanks (Reagent Blanks), and known standard solutions.

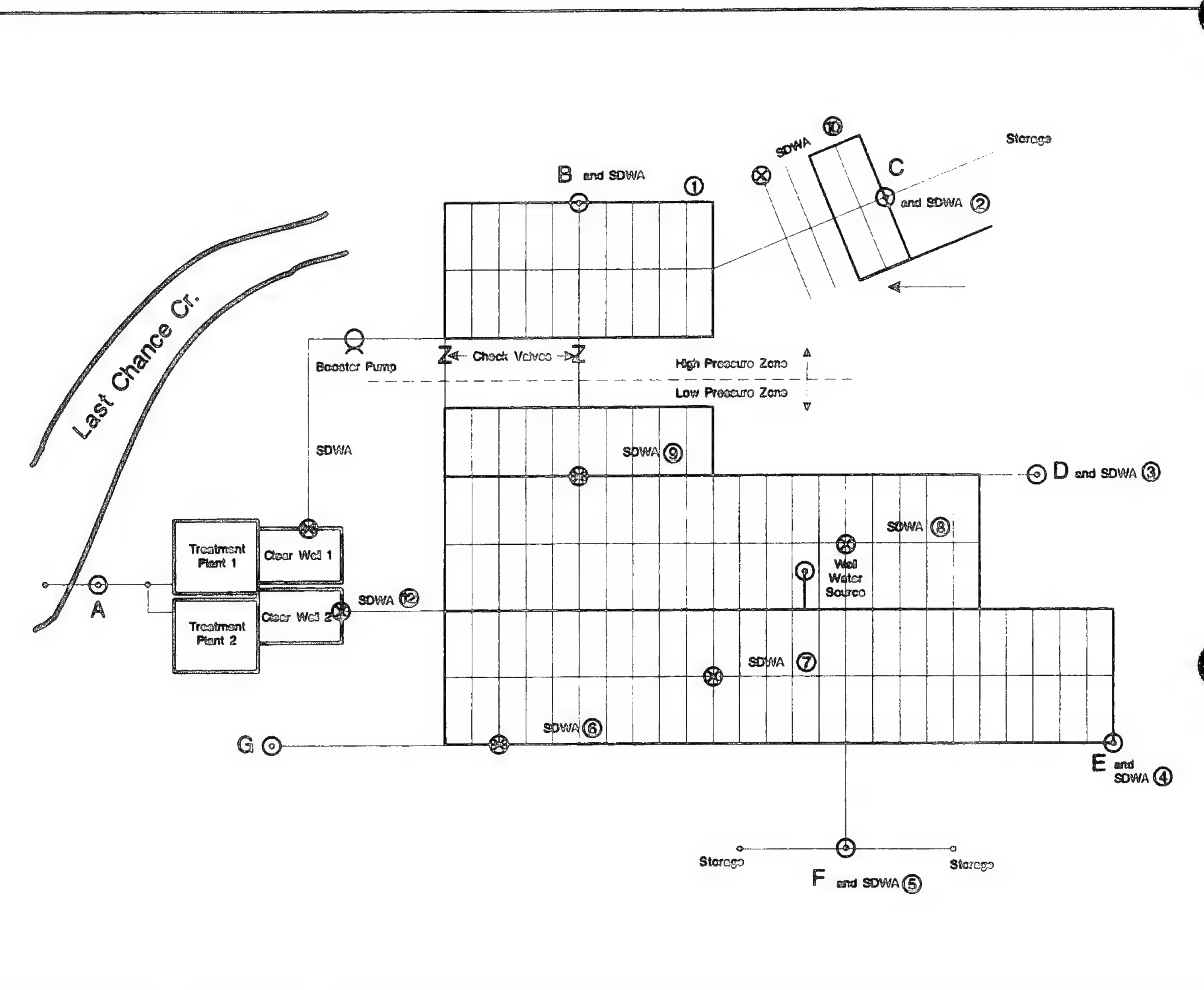
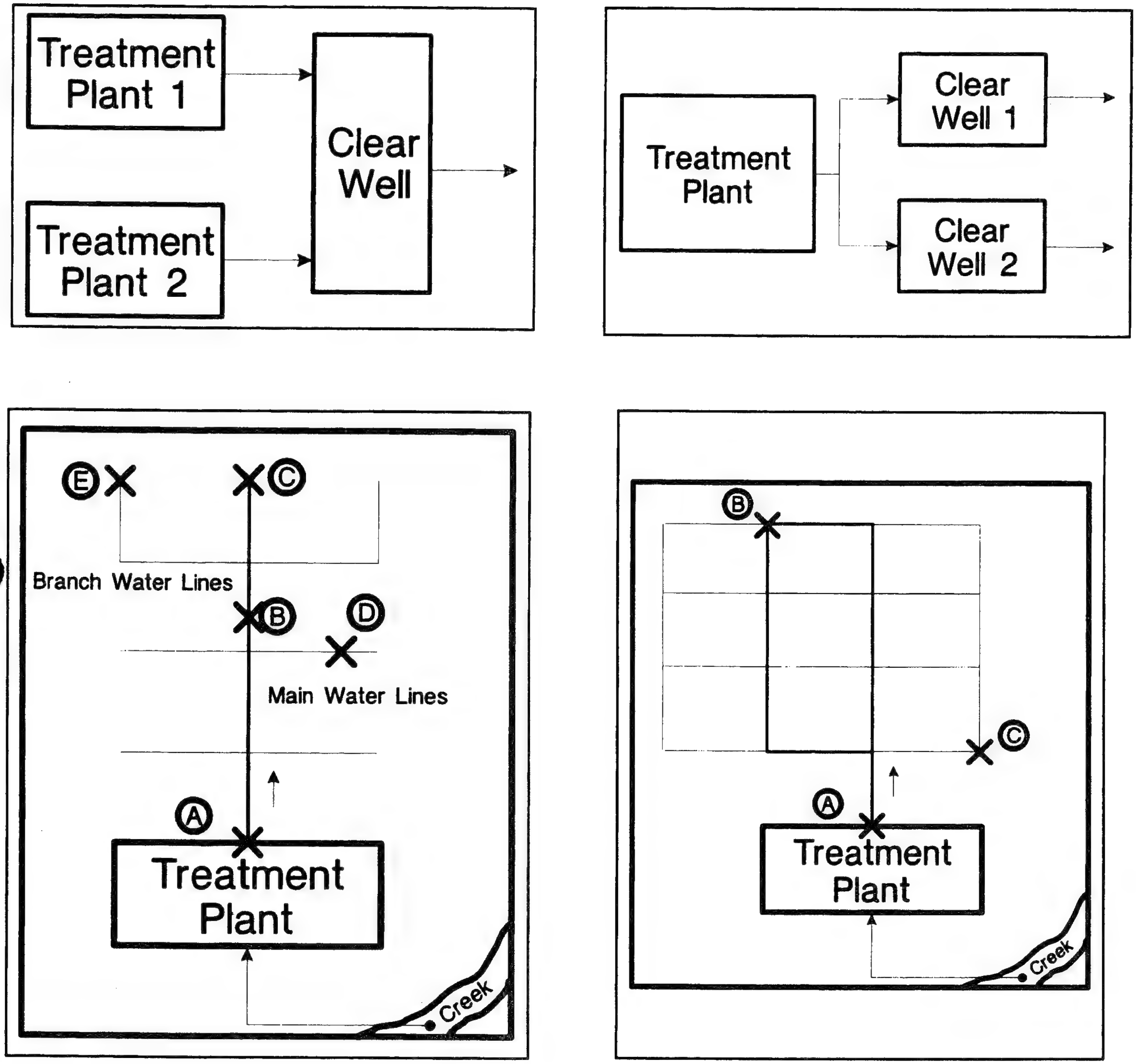


Figure 1: Distribution of Sampling Location

Figure 2: Distribution of Sampling Location.



Hazardous Waste Sampling
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Introduction

Sampling of waste is conducted for a variety of reasons. In most cases, it is performed to determine whether or not the waste is hazardous or not as outlined in 40 CFR part 261, or various state, federal, DoD or international regulations. Most often the sample is analyzed to determine proper classification as to whether or not the waste is a characteristic waste or a listed waste. From this information proper storage, transportation, treatment and disposal can be determined.

Through proper waste segregation, pollution abatement, reuse and recycling, process knowledge and waste minimization the amount of "unknown wastes" in the Air Force has dropped dramatically. Currently most emphasis is being place upon identifying processes in which less toxic/hazardous materials maybe used. Through proper waste stream characterization, the need for sampling and analysis has been reduced.

The management and disposal of hazardous waste is based primarily on the chemical composition and characteristics displayed by the waste. From this information the proper management decisions can be made to provide safe and cost effective treatment and disposal.

The evaluation of waste material sampling and methods for environmental and health hazards is an ongoing effort by the USEPA and state regulatory agencies. In order to make the proper sampling and analysis request you must be up-to-date with all current federal and state regulations. It is strongly recommended that prior to the development of a sampling plan or actual sampling, the following documents be obtained and studied:

Code of Federal Regulations (CFR)
29 CFR 1910
49 CFR parts 107, 171-177
40 CFR parts 261-279

US. Environmental Protection Agency (USEPA) manuals:
SW-846, "Test Methods for Evaluating Solid Wastes"
600/2-80-018 "Samplers and Sampling Procedures for Hazardous Waste Streams"
530-R-94-024 Waste Analysis Plans--A Guidance Manual

Any state or local regulations pertaining to waste, analysis and disposal.
Your local Defense Reutilization and Marketing Office (DRMO), and disposal contractors will also be able to provide you with critical information to make your sampling and analysis effort more effective.

In general, sampling of hazardous waste requires the collection of a representative sample of adequate quantity. Sampling situations vary greatly, consequently there is no one sampling and analysis strategy or procedure to follow. However, there are some general guidelines for various types of wastes in the wide range of containers encountered. In the following sections, sampling and analysis methods and protocols will be explained. If you have questions or are not clear concerning any phase of sampling or what analysis to request, please do not hesitate to contact the Armstrong Laboratory for guidance.

	Voice	FAX
Analytical Services Division:	DSN 240-3626	240-9043
	COM (210)536-3626	(210)536-9043
	DDN (E-mail): wantland@oehl.brooks.af.mil	
Bioenvironmental Engineering	DSN 240-3305	240-3945
	COM (210)536-3305	(210)536-3945
	DDN (E-mail): esc@oehl.brooks.af.mil	

II. Waste Sampling Plan

Proper sampling requires a plan of action. This plan is designed to maximize the safety of sampling personnel and increase the accuracy of the analysis while protecting the integrity of the sample after it is taken. The following basic considerations are recommended for development of your own plan. See 40 CFR 264.13 for specific waste analysis plan requirements.

Sampling Plan:

A. Define objectives

   (1) Research the background information about the waste, i.e. the process producing the waste and the physical form of the waste.

   (2) Determine what parameters should be analyzed

B. Select the Proper Sampler and the required Safety/Health Procedures

C. Develop an Appropriate Strategy for the Specific Situation

   (1) Location of required sampling

   (2) Determine the required number of samples

   (3) Determine the volume of samples required

   (4) Determine the type of sample required

   (5) Situation, Paying Critical Attention to Representativeness

D. Collect Samples and Label Properly

E. Record sample information in field Notebook

F. Fill out Chain-of-Custody Forms

G. Fill out Analysis Request Forms

H. Ship by the most expeditious method to the laboratory for analysis

III. Sampling

The following procedures are recommended for sampling from different types of containers and sources. Some of the following information has been extracted from SW-846 Test Methods for Evaluating Solid Wastes Volume II, (update I):

Sampling from a Drum:

Drum sampling is the most common and potentially the most dangerous. Often times drums have been stored in the environment thus being exposed to climatic changes which may degrade the drums integrity and change the chemical composition of the material inside the drum. This may produce the possibility of a spill, if the drum is leaking, or the potential of explosion or exposure to harmful chemicals due to pressure build up with in the drum. Careful inspection of the drum prior to sampling is critical. Determine if the drum is sound. Is it heavily rusted, dented, cracked, or bulging? Is material currently leaking out of the container? Are the bungs in good shape? If the drum is not in acceptable condition it may require over packing and venting prior to sampling. Safety prior to and during sampling cannot be over emphasized. All personnel performing sampling must have attended the 40 hour Hazardous Waste Operations and Emergency Response Course and have complete any required refresher training. The School of Aerospace Medicine at Brooks AFB should be contacted for information concerning this mandatory training.

Prior to sampling make sure you have all required materials and equipment. This should include sample bottles, sampling devices including disposable colawasas, drum thiefs, augers, hand scoops, and triers, water proof markers, spark proof bung wrenches, tool kit, field notebooks, paper towels, sealing tape (duct and cellophane), labels, funnels, and all required personal protective and safety equipment.

Closed Head Drum

The drum should be inspected and if found to be in satisfactory condition the bungs should be cleaned of dirt and debris. The proper bung wrench should be inserted into the large bung and very slowly removed. If pressure is released when unscrewing the bung, one should leave the area until all gases have escaped. Once the bung has been removed, a visual inspection of the drum should be performed. In most cases the material inside a closed head drum will be a liquid. If this is the case, a coliwasa is the sampler of choice. The coliwasa should be opened and placed in a vertical position over the open bung and then slowly lowered to the bottom of the drum. At this point close the sampler by pushing the inner glass rod firmly down to lock the tip closed. Pull the coliwasa slowly out of the drum. Be cautious of any material dripping off the sampler. Place the end of the coliwasa over the open sample bottle and release the inner rod to allow the sample to run into the bottle. Depending upon the amount of sample required, several repetitions of the above action may be required. Extreme care is needed to obtain a representative sample. If the drum contains several layers (phases), the coliwasa must be inserted slowly to ensure each phase is sampled properly. Failure to obtain a representative sample will result in inaccurate analysis and possibly improper disposal. When a sufficient sample volume has been acquired, break the coliwasa at the scored mark by pressing it against the bung until it breaks. Allow both pieces to fall into the drum. Replace the bung and tighten. Properly clean and label all sample bottles. Clean and/or remove any soiled sampling equipment and safety devices

If the material in the drum is a solid, semi-solid, sludge, or slurry, a representative sample MUST be obtained. For these types of samples a trier, drum thief or auger should be used. (refer to table in this section) Again, follow all safety precautions. Place the sample into a wide-mouth glass bottle and seal. Depending upon the composition of the material several samples may have to be taken.

Open Head Drum

Much of the sample precautions for the closed head applies to the open head drum. The lid for a open head drum is held in place by a steel band tightened be a large bolt. Prior to unscrewing the bolt ensure that sufficient work room is available to operate large adjustable (crescent), pipe or socket wrenches, pry bars and large screw drivers. Again ensure that the drum is in good condition and is not bulging. If it is not, over packing and venting may be required. If the drum and ring is rusted it may have to be cut off. Extreme caution should be used due to possible explosive/flammable vapors present in the drum storage area.

Slowly unscrew the bolt until it is free of one side of the ring. Pry the ring off and over the top of the drum. Some rings are very strong and may require quire of bit of force to remove. Caution should be exhibited when removing the rings for two reasons. First, the ring may fly off the drum and harm someone. Secondly, if liquid is in the drum a spill may occur, if the drum is rocked or upset while attempting to remove the ring and lid.

Once the drum is open, inspect the material inside if it is a liquid, follow the sampling information above. If it is a solid, determine if it is a homogeneous or heterogeneous material. An auger may be required to adequately determine this. Determine the correct sampling device and amount required for the analysis, refer to tables in this section.

When sampling is complete, replace the lid and ring. Difficulty may be encountered due bending of the ring during removal, care must be exercised to avoid injury.

Sampling from a Barrel, Fiber drum, Can, Bag or Sack Containing Powder or Granular Waste

It should be understood that although the material may be dry, proper protective equipment should be worn. Dry material tends to generate airborne particles when disturbed which can be inhaled or absorbed through the skin. Barrels, fiber drums or cans should be placed upright to allow easy access to openings. Care needs to be exercised when moving bags and sacks since, they may rupture when moved creating a spill. If possible these should not be moved prior to sampling.

Collect a composite sample of the dry material from various depths and locations to obtain a representative samples with any appropriate sampler such as a trier.

Sampling a Vacuum Truck

Sampling the contents of a vacuum truck requires the person to climb into the truck and walk among the catwalk. In some trucks, ladders are required to enter the hatch. The buddy system should be used to ensure safety of persons conducting the sampling. The person collecting the sample should position themselves only after the truck hatch has been opened, thus allowing pressure and potentially toxic vapors to dissipate. The sample is normally collected from a catwalk as a grab sample; however, if the contents of the truck are layered, a representative sample must include each layer.

Tanks

The collection of liquid wastes from a storage tank poses similar problems as from a truck. Entering the tank with protective equipment is difficult; so again, it is better to use the buddy system to ensure the safety of the persons conducting the sampling. It is best to have a person from the storage tank facility present when sampling to provide information on the contents of the tank and to provide assistance if required. Tanks should be treated as confined areas.

Tanks are essentially large containers. The considerations involved in sampling tanks are therefore similar to those for sampling containers. As with containers, the goal of sampling tanks is to acquire a sufficient number of samples from different locations within the tank, providing analytical data that is representative of the entire tank contents.

The accessibility of the tank contents will affect the sampling methodology. If the tank is an open tank, allowing unrestricted access, then usually a representative set of samples is best obtained using the three-dimensional simple random sampling strategy. This strategy involves dividing the tank contents into an imaginary three dimensional grid. As a first step, the top surface of the waste is divided into a grid whose sections either approximate the size of the sampling device or are larger than the sampling device if the tank is large. (Cylindrical tanks can be divided into imaginary concentric circles, which are then further divided into grids of equal size.) Each section is assigned a number. The height of the vertical space required determines the type of sampling device. These imaginary levels are assigned numbers. Specific levels and grid locations are then selected for sampling using a random-number generator or random-number table.

A less comprehensive sampling approach may be appropriate if information regarding the distribution of waste components is known or assumed (e.g., if vertical composting will result a representative sample). In such cases, a two dimensional simple random sampling strategy may be appropriate. In this strategy, the top surface of the waste is divided into an imaginary grid; grid sections are selected using random-number tables or generators; and each selected grid point is then sampled in a vertical manner along the entire length form top to bottom using a sampling device such as a weighted bottle, drum thief, or coliwasa. If the waste is known to consist of two or more discrete strata, a more precise representation of the tank contents can be obtained by using the two or three-dimensional simple random sampling strategy.

Some tanks permit only limited access to their contents, restricting the locations within the tank from which samples can be taken. If sampling is restricted, the sampling strategy must, at a minimum, take sufficient samples to address the potential vertical anomalies in the waste in order to be considered representative. This is because contained wastes tend to display vertical rather than horizontal, non random heterogeneity due to settling of suspended solids or denser liquid phases. If access restricts sampling to a portion of the tank contents (e.g. in an open tank the size of the tank may restrict sampling to the perimeter of the tank; in a closed tank, the access may be through inspection ports), then the resulting analytical data will be deemed representative only of the accessed area, not of the entire tank contents unless the contents are known to be homogeneous.

If a limited access tank is to be sampled, and little is known about the contents of the tank, a set of samples that is representative of the entire contents can be obtained by taking a series of samples when the tank contents are being drained. This should be done in a simple random manner by estimating how long it will take to drain the tank and randomly selecting times during drainage for sampling. Never arbitrarily drain a tank! This could put you and the environment at risk.

The most appropriate type of sampling device for tanks depends on the tank parameters. In general subsurface samplers (i.e. pond samplers) are used for shallow tanks, and weighted bottles are usually employed for tanks deeper than 5 ft. Dippers are useful for sampling pipe effluents.

Sampling from Landfills, Ponds, and Lagoons

Landfills contain primarily solid waste, whereas lagooned waste may range from liquids to dried sludge residues.. Lagooned waste that is either liquid or semisolid is often best samples using the methods recommended for large tanks. Usually, solid wastes contained in a landfill or lagoon are best sampled using the three dimensional random sampling strategy.

The three dimensional random sampling strategy involves establishing an imaginary three dimensional grid of sampling points in the waste and then using random-number tables or random-number generators to select points for sampling. In the case of landfills and lagoons, the grid is established using a survey or map of the area. the map is divided into two-dimensional grids with sections of equal size. These sections are then assigned numbers sequentially.

Next, the depth to which sampling will take place is determined and subdivided into equal levels, which are also sequentially numbered. (the lowest sampling depth will vary from landfill to landfill. Usually, sampling extends to the interface of the fill and the natural soils. If soil contamination is suspected, sampling may extend into the natural soil.) The horizontal and vertical sampling coordinates are then selected using random-number tables or random-number generators. If some information is known about the nature of the waste, then a modified three-dimensional strategy may be more appropriate. For Example, if the landfill consists of several cells, a more precise measurement may be obtained by considering each cell as a stratum and employing a stratified three-dimensional random sampling strategy.

Hollow-stem augers combined with split spoon samplers are frequently appropriate for sampling landfills. Water driven or water rinsed coring equipment should not be used for sampling because the water can rinse chemical components from the samples. Excavation equipment such as backhoes, may be useful in obtaining samples at various depths; the resulting holes may be useful for viewing and recording the contents of the landfill.

Waste treatment and storage ponds vary in size and shape. The pond should be marked (staked off in a two dimensional grid) with sections of equal size. Grab samples from various depths at the intersections of the grid may then be composited to give a fairly good representative sample of the pond or lagoon. Note: smaller grid sections will result in a more representative sample.

Waste Piles

In waste piles, the accessibility of waste for sampling is usually a function of pile size, a key factor in the design of a sampling strategy for a waste pile. Ideally, piles containing unknown wastes should be sampled using a three dimensional simple random sampling strategy. This strategy can be employed only if all points within the pile can be accessed. In such cases, the pile should be divided into a three-dimensional grid system, the grid sections assigned numbers, and the sampling points then chosen using random-number generators.

If sampling is limited to certain portions of the pile, then the collected sample will be representative only of those portions, unless the waste is known to be homogenous.

In cases where the size of the pile impedes access to the waste, a set of samples that are representative of the entire pile can be obtained with a minimum of effort by scheduling sampling to coincide with pile removal. The number of truckloads needed to remove the pile should be estimated and the truckload randomly chosen for sampling.

The sampling devices most commonly used for small piles are thiefs, triers, and shovels. Excavation equipment, such as backhoes, can be useful for sampling medium-sized piles.

Soil

There are many techniques for soil sampling. The normal objective is to determine if the soil contains any hazardous materials (characteristics) that would classify it as a hazardous waste under RCRA. Generally, soil is sampled using a grid determination as previously discussed. Composite sampling may be used by combining samples from several grid points into one sample.

Sampling devises for soil include augers, thiefs, shovels, and hand scoops. The tool used is determined by the consistency of the soil and the type of sample desired.

Sample Compositing

The compositing of samples is usually done for cost saving reasons. This involves combining a number of samples or aliquots of a number of samples collected from the same waste. The disadvantage of sample compositing is the loss of concentration variance data, whereas the advantage is that, for a given cost in analysis and sampling equipment a more representative (i.e. more accurate) sample is obtained.

The actual compositing of samples requires the homogenization of all component samples to ensure that a representative subsample is aliquoted. The homogenization procedure, and the containers and equipment used for compositing, will vary according to the type of waste being composited and the parameters being measured. In the laboratory, the sample will again be homogenized prior to analysis.

The laboratory suggests that compositing only be performed when there is little doubt that the material being sampled are identical in chemical composition and/or have been contaminated with the same material. Onsite workers, user knowledge, shop folders, supply documents, process knowledge and to a certain extent, visual inspection can be used to determine which samples are candidates for compositing. Generally, when deciding which samples are to be composited, no more than 4 drums or grid points should be combined. This limit will provide increased sample accuracy and reduce the cost and time resampling if the drums or area has to be individually sampled due to high contaminate concentrations or data acceptance problems are encountered.

When compositing it is essential that equal volumes are collected and homogenized from each sampling source. This will ensure that a representative sample is obtained. For example, if four drums are to be composited, 25% of the total sample should be from each drum. If the material is layered (phased) a representative sample from each layer must be collected. If the material is layered (i.e. oil and water) records should be maintained to reflect the approximate percentages of each layer for each drum or container. This data will be very helpful when disposal or turn-in occurs.

Although compositing saves time and money it should only be performed when there is certainty that the material is identical. If one drum out of the four or grid points exhibits a characteristic or contains a listed waste, all the composited waste must be handled and disposed of as hazardous waste or resampled individually. If questions concerning compositing arise contact the laboratory for guidance.

IV. Sampling Devices

This section describes examples of sampling equipment and suggests potential uses for this equipment and suggests potential uses. Some of these devices are commercially available, but others will have to be fabricated by the user. The information in this section is general in nature and therefore limited in scope. It is designed only to aquaint you with the wide array of sampling equipment available.

Cleaning and Decontamination of Sampling Equipment

Armstrong Laboratory recommends the use of disposable sampling devices whenever possible. When this is not feasible, efforts should be made to thoroughly clean the sampling devices between each sample site. If non organics are being sampled, (soil, sludge, paint chips etc.) a thorough cleaning with soap and water should be sufficient. However, when solvents are being sampled, (fuel, paint waste, used oil, contaminated solids etc.) a solvent such as Hexane and/or Acetone in addition to the soap and water may be required. Each device should be thoroughly cleaned and rinsed and allowed to dry between each use. All used cleaning materials, brushes, rags, water and solvents should be collected and stored in a suitable container. These materials should be tested to determine the suitable disposal method.

Composite Liquid Waste Sampler (Coliwasa)

The Coliwasa is a device employed to sample free-flowing liquids and slurries contained in drums, shallow tanks, pits, and similar containers. It is especially useful for sampling wastes that consists of several immiscible liquid phases (layers).

The coliwasa consists of a glass, plastic, or metal tube equipped with an end closure that can be opened and closed while the tube is submerged in the material to be sampled. Its design allows for rapid collection of wastes therefore minimizes the potential for exposure to sampling personnel. It is highly suggested that disposable borsilicate glass coliwasas be used to reduce the possibility of sample cross contamination. Disposable coliwasas are easy to use and dispose of when sampling is completed. (refer to Figure in this section)

It should be noted that the choice of material the coliwasa is made of is driven by the chemical composition of the sample. For example, a plastic (PVC) coliwasa would not be used to sample a drum of paint solvent waste due to the fact the coliwasa may dissolve during sampling and/or contaminate the sample.

Coliwasas are available from the GSA and commercial supply houses.

Weighted Bottle

This sampler consists of a glass or plastic bottle, sinker, stopper, and a line that is used to lower, raise, and open the bottle. The weighted bottle samples liquids and free flowing slurries. Weighted bottles must conform with ASTM specifications D270 and E300. (refer to Figure in this section)

Dipper

The dipper consists of a glass or plastic beaker clamped to the end of a telescoping aluminum or fiberglass pole that serves as the handle. A dipper samples liquids and free flowing slurries. Dippers may not be available commercially. (refer to Figure in this section)

Thief

A thief consists of two slotted concentric tubes, usually made of stainless steel or brass. The outer

tube has a conical pointed tip that permits the sampler to penetrate the material being sampled. The inner tube is then rotated to open or close the sampler. A thief is used to sample dry granules or powdered wastes whose particle diameter is less than one-third the width of the slots. A thief is readily available from commercial sources. (refer to Figure in this section)

Trier

A trier consists of a tube cut lengthwise in half with a sharpened tip that allows the sampler to slice into sticky solids and sludges and to loosen soil. A trier samples moist or sticky solids with a particle diameter less than one-half the diameter of the trier. Triers are generally 61 to 100 cm long and 1.3 to 2.5 cm in diameter. They are available from commercial sources. If larger triers are required they may be fabricated. (refer to Figure in this section)

Auger

An auger consists of sharpened spiral blades attached to a hard metal central shaft, similar to a large drill bit. This device may be manually or machinery driven. Augers are most often used to sample hard or packed solid wastes or soil at a depth of 8" or more. Augers are not recommended when an undisturbed soil or waste sample is required. For sampling undisturbed core soil samples use a Viehmeyer soil sampler. Augers are readily available from GSA and commercial sources.

Viehmeyer Soil Samplers (Core Sampler)

This sampler is deigned to collect core soil samples. A point is placed on the sampling tube which is then driven into the ground. The hammer or pounding device sometimes serves as a handle to remove the core after the sample has been collected. These samplers are commercially available. (refer to Figure in this section)

Scoops and Shovels (Trowels)

Scoops and shovels are used to sample granular or powdered material in bins, shallow containers, and conveyer belts. Both are readily available from many sources.

Some of the above equipment may be available from the laboratories equipment loan function (DSN 240-2130). Refer to Figures in this section.

NOTE: Because each sampling situation is unique, the cited equipment and applications may have to be modified to ensure that a representative sample is collected and its physical and chemical integrity are maintained. It is the responsibility of those persons conducting sampling to make appropriate modifications.

The following table contains examples of sampling equipment and potential applications. It should be noted that these suggested sampling devices may not be applicable to a user situation due to waste or site-specific factors. For example, if a waste is highly viscous or if a solid is clay-like, these properties may preclude the use of sampling devices. The size and depth of a lagoon or tank, or difficulties associated with accessing the waste, may also preclude use of a given device or require modification of its deployment.

TABLE X-1 EXAMPLES OF SAMPLING EQUIPMENT FOR PARTICULAR WASTE TYPES

Waste Type	Drum	Sacks & Bags	Open-bed Truck	Closed-bed Truck	Storage Tanks & Bins	Waste Piles	Ponds & Lagoons	Conveyer Belts
Free-Flowing Liguids and Slurries	Coliwasa	N/A	N/A	Coliwasa	Weighted Bottles	N/A	Dipper	N/A
Slurries	Trier	N/A	Trier	Trier	Trier	*	*	
Moist Powders or Granules	Trier	Trier	Trier	Trier	Trier	Trier	Trier	Shovel
Dry Powders or Granules	Thief	Thief	Thief	Thief	*	Thief	Thief	Shovel
Sand or Packed Powders and Granules	Auger	Auger	Auger	Auger	Thief	Thief	*	Dipper
Large grained solids	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Trier

This type of sampling situation can present significant logistical sampling problems, and sampling equipment must be specifically selected or designed based on site and waste conditions. No general statement about sampling can be made.

V. TCLP Information
Analysis and Sampling

The Toxicity Characterization Leachate Procedure (TCLP) is one of the most important analysis procedures that is available to characterize potentially hazardous waste. This method, SW-1311, simulates the conditions that a waste will encounter while in a landfill. This information is vitally important to determine whether or not a waste is a characteristic waste and what is the best disposal method for that solid waste.

WHAT IS THE TCLP?

The TCLP is a method used to determine whether a sample of waste exhibits a characteristic which will classify it as a hazardous waste. The TCLP procedure is outlined in 40 CFR part 261, subpart C. The actual method 1311 is outlined in Methods for the Analysis of Solid Waste, SW-846. This consists of a list of 40 various chemical compounds determined by the U. S. EPA as presenting a serious threat to health and the environment. These analytes include 8 metals, 11 volatiles, 12 semi-voilatiles and 6 pesticides/herbicides. If the waste is found to contain a level above the regulatory limit on any one TCLP analytes, that waste is a characteristic waste.

ANALYTE	REGULATORY LIMIT (mg/l)	METHOD
METALS		
Arsenic	5.0	1311+7060A
Barium	100.0	1311+7081
Cadmium	1.0	1311+7131
Chromium	5.0	1311+7191
Lead	5.0	1311+7421
Mercury	0.2	1311+7470A+7471A
Selenium	1.0	1311+7740
Silver	5.0	1311+7761
VOLATILES		
Benzene	0.5	SW8240/8260
Carbon Tetrachloride	0.5	"
Chlorobenzene	100.0	"
Chloroform	6.0	"
1,2-Dichloroethane	0.5	"
1,1-Dichloroethylene	0.7	"
Methyl Ethyl Ketone	200.0	"
Tetrachloroethylene	0.7	"
Trichloroethylene	0.5	"
Vinyl Chloride	0.2	"
SEMI-VOLATILES		SW8270
Cresol, (o, m, p)	200.0	"
1,4-Dichlorobenzene	7.5	"
2,4-Dintrotoluene	0.13	"
Hexachlorobenzene	0.13	"
Hexachlorobutadiene	0.5	"
Hexachloroethane	3.0	"
Nitrobenzene	2.0	"
Pentachlorophenol	100.0	"
Pyridine	5.0	"
2,4,5-Trichlorophenol	400.0	"

2,4,6-Trichlorophenol	2.0	"
PESTICIDES		
Chlordane	0.03	SW8080
Endrin	0.02	"
Heptachlor	0.008	"
Lindane	0.4	"
Methoxychlor	10.0	"
Toxaphene	0.5	"
HERBICIDES		
2,4-D	10.0	SW8150
2,4,5-TP (silvex)	1.0	"

The actual procedure simulates what, if any, of the 40 listed analytes will leach out of the material if it is placed into a landfill. The method requires at least 105 grams of solid material and 2 liters if the waste is a non-organic liquid. If the sample is a solid the method requires a "extraction". This means that the sample is mixed with a acidic water solution similar to the rain water trapped in a landfill. This extraction requires 18 hours to accomplish. Once the extraction is complete, the "extract" is filtered and then prepared for the various analytical procedures for metals, volatiles, semi-volatiles and pesticides.

WHAT IS THE TCLP USED FOR?

The TCLP is one of four characteristics the EPA uses to determine if a waste is a hazardous waste via characteristic. Most DRMO and/or waste disposal companies require a complete analysis of all "unknown" wastes and known waste streams prior to acceptance. This information is also often required by local, state and federal regulations to be listed/included on all waste manifests, shipping documents and waste stream logs.

WHY REQUEST THE TCLP?

When a waste is "unknown" or requires a waste stream baseline or annual retest the TCLP should be requested. In a known waste stream it is vitally important to ensure that the waste has not changed. The TCLP information combined with the Major Components and the other three characteristics will allow proper characterization of a waste under RCRA.

WHEN IS THE TCLP NOT APPLICABLE?

There are three reasons a sample may not be a candidate for the TCLP:

1) The sample is an organic liquid

2) The sample may contain a "listed waste"

3) The sample has demonstrated a characteristic other than the TCLP

As previously stated, the TCLP is used to determine if a material can be legally placed into a landfill by determining if it will leach any of the TCLP contaminants above the regulatory limit. Since land filling of organic liquids is not legal under the Land Ban Restrictions the TCLP is not applicable for them.

Secondly, the TCLP is a "EXTRACTION" procedure. The laboratory cannot extract an organic liquid

using a aqueous media. Since Method 1311 states that if a sample is "not compatible with the extraction fluid" it should be analyzed separately. What this means is that other methods should be used to determine if a sample is a hazardous waste. These alternatives will be discussed later.

If a sample contains a listed waste, as listed in 40 CFR 261, subpart D, no further analysis is required under RCRA. The waste must be managed as a hazardous waste. If a MSDS is available, one may determine if the material contains a listed waste from that document. User knowledge may also be used to determine contents. Unfortunately, many disposal firms and certain DRMOs refuse to accept user knowledge for turn-in. Often times a complete laboratory analysis is still required regardless of how fool-proof waste stream documentation or user knowledge are. There are several methods available in the laboratory to determine whether or not a sample contains a listed waste. These also will be discussed under "alternatives".

A sample may exhibit another characteristic such as ignitability, corrosivity, or reactivity. If this is the case, TCLP is not required as outlined in 40 CFR. The waste should be classified as hazardous, and managed as such.

ALTERNATIVES

As previously discussed, there are several alternatives to the TCLP. The primary reason for these alternative procedures are to determine the contents of the sample. Hopefully, from these analysis results, the waste can clearly be defined as hazardous or not. It must be remembered that these results are TOTAL values and not "extract" concentrations. These total concentration results cannot be substituted for, converted to, nor interchanged with TCLP results. They should be used to determine whether or not a sample contains a listed waste or if the total values are lower that the TCLP regulatory limits. If this is the case, a TCLP is not required due to the fact that a "extraction value" cannot be higher than a total concentration.

The alternative methods are listed on the following page:

METHOD	CONTAMINANTS DETECTED	REASON TO USE
SW-8240 listed wastes	"F" wastes, solvents	Solvent screen, total values,
SW-8260	Same as SW-8240	Same as SW-8240
SW-8020(BTEX)	Non-Halogentated Solvents Benzene Ethylbenzene Xylenes (o,m,p)	Possible POL Contamination, TolueneTotal values,solvent screen
SW-8080	Chlorinated Pesticides, PCB	Screen
ASTM 5.02 "TX"	Halogen Screen Screen only,	Semi-quantitative
SW-7000 series	"Total" TCLP Metals	POL wear metals, paint solvent metal content
Energy Recovery	Metals, Solvents, PCB	POL organic

		liquids
Major Components	All above 1% by volume	ID. Material

These methods can be asked for in lieu of the TCLP when required. They will help classify your waste correctly according to the established listed of hazardous constituents. The analysis methods used in the TCLP are the exact methods listed above except no extraction takes place prior to analysis. When the TCLP is not applicable, these methods are employed in the lab to ID. and quantify wastes.

A special note for paint and stripper wastes, these are special cases and a difficult analytical call. In most instances, they are NOT TCLP candidates due to the fact that they are organic liquids. However if a large amount of the sample is solids (chips, sludge, paint solids, ect) then this material may be extracted for the TCLP. Generally, if a sample is greater than 25% solids a TCLP maybe performed. If not, major components, SW-8240, total metals content and ignitability should be requested. The laboratory can assist you in making these decisions.

As the emphasis shifts from disposal to reuse/recycling the Energy Recovery analysis is becoming more and more popular. The regulatory limits and uses for this analysis is listed in 40 CFR, part 266, Subpart E, "Used Oil Burned for Energy Recovery". This analysis includes total metals for arsenic, cadmium, chromium, lead, total halogens, PCB, ignitability, and major components. This test should be requested on all non-phased POL wastes. This will give your TSDF the proper information to burn the material safely in a licensed incinerator.

SAMPLING FOR THE TCLP

Sampling correctly for the TCLP is extremely important. ***ANALYSIS QUALITY CAN ONLY BE AS GOOD AS THE SAMPLE SUBMITTED***. Whether you are sampling a drum, bowser, pit, separator, tank, or anything else, always submit a representative sample in sufficient quantity.

SW-846 specifies certain quantities required for the TCLP and other analysis. The laboratory ***CANNOT*** divert from the required amounts for analysis without compromising quality and validity of results. Therefore, the guidelines below are the ***MINIMUMS***, more is much better than too little.

LIQUID SAMPLES

TCLP-full	2 liters and 2-40 ml VOA bottles (not phased, aqueous) 3 liters and 2-40 ml VOA bottles (phased >50%)
TCLP-no pesticides/ herbicides	2 liters and 2-40 ml VOA bottles
TCLP-Metals only	1 liter
Energy Recovery	1 liter
SW-8240, 8260, 8020	1 liter (if organic); 1 liter and 2-40 ml VOA if aqueous
Major Components	500 ml

SOLID SAMPLES

TCLP-Full	250 grams
TCLP-no pesticides/ herbicides	250 grams
TCLP-metals	250 grams
SW-8240, 8260, 8020	500 grams

Note: *All samples must be in a glass bottle with a TFE lined lid and should be cooled to 4 degrees C.*

It should be noted that the pesticides/herbicides analysis requires 1 liter of sample for each. Therefore, if a Full TCLP is requested then at least two additional liters of aqueous sample must be submitted. If two or more of the other parts of the TCLP analysis is required then, at least two liters are required.

Solid samples present unique sampling problems. Soil and sludge are fairly simple. Simply, 250 grams of a representative sample of the site should be submitted. Other solids samples are not quite as simple.

Rags also require 250 grams of sample. However since rags are not contaminated evenly then a choice of the proper sample and analysis is critical. It should be remembered that the rag itself is not a hazardous waste, the contaminant is the concern. If a good waste stream history is available then the contaminant on the rags should be easily determined. If not, analysis may be required. Most rags are used in one of two areas, Corrosion Control or A/C Maintenance. Many known and listed hazardous wastes are used in these areas, this means that analysis of the rags is often required. When sampling, a worst case scenario is safest. Pick the worst contaminated rags. This will provide data on the most contaminated rags thus provide disposal information. Although this method will provide you with information on the most contaminated waste, often a representative sample will show that the entire collection of waste is not a hazardous waste under RCRA. Local, state and federal regulating bodies and disposal regulations should be consulted to determine the proper sampling method.

Analysis on rags and other similar materials are requested similarly to liquid samples. If analysis on the rags is required then contact the laboratory for proper sampling protocols.

Filters also often require TCLP analysis. Filters from paint booths often are large in size and will not fit in a quart bottle. If this is the case, place at least 250 grams of material in a heavy duty plastic bag and send it in for analysis. As with rags, the filter itself is not a hazardous waste, the dust on the filter may cause the filter to fail the analysis. Consequently, extreme care should be taken to avoid shaking the dust from the filter. All dust, dirt, chips, and debris must be sent with the filter for analysis.

Oil, fuel, and gas filters are also unique. 250 grams of the filter element must be submitted for analysis. This may require you to have the outer metal case cut and remove the element for analysis. If the filter is a cartridge type then the whole filter maybe submitted.

Normally, the TCLP metals, volatiles and semi-volatiles are of interest. Pesticides and herbicides are often not required by DRMOs/disposal companies.

The proper way to mark the AF Form 2751 is outlined on the handout. However, If the full TCLP is

required then simply write on the "A" line of the form. If only the metals portion is required then simply write TCLP-Metals. When a single metal is required then indicate that metal only (I.E. TCLP-Arsenic only). If the other characteristics are required then check the hazardous/toxic waste box. This will provide you with:

Major Components
Ignitability
Corrosivity (pH)
Reactivity
TCLP-Metals

Prior to submitting any sample to the laboratory please remember: ***ALWAYS ASK YOUR DRMO, STATE REGULATORY AGENCY OR DISPOSAL CONTRACTOR WHAT ANALYSIS IS REQUIRED FOR DISPOSAL PRIOR TO SUBMITTING SAMPLES FOR ANALYSIS***. This is to insure that the analysis you get is what you need to dispose of the material safely and legally.

The Armstrong Laboratory recommends that all samples be collected in clear heavy-duty 1 liter glass bottle. A wide-mouth bottle is required for solid/sludge samples. A bottle similar to Qor-pak-Q is the best. These bottles can be obtained from all major scientific/medical suppliers.

All samples should be well packaged and shipped by the most expeditious method. Delay in shipping the samples will only postpone analysis and possibly risk missing some holding times established by the EPA for volatile components.

Requirements for shipping samples to a laboratory for analysis is outlined in 40 CFR part 261.4, para D. This states that most federal requirements can be waived as long as the sample is properly packaged, marked and labeled according to CFR. Some overseas locations may be affected by the recent International Air Transport Agreements (IATA). These requirements are not much more restrictive than those listed in 40 CFR. They simply require the proper labeling and manifesting prior to shipment. Contact your carrier or the laboratory prior to shipment for guidance.

Assistance in sampling or analysis are always available to you. Contact the Armstrong Laboratory for assistance. Please use the following numbers:

DIVISION

ANALYTICAL SERVICES (AL/OEA)	FAX:	(DSN) 240-9043
		(COM) (210)536-9043
	PHONE:	(DSN) 240-3626
		(COM) (210)536-3626

Email/INTERNET ADDRESS: ECS@OEHL.brooks.af.mil **OR** If you know the last name of the individual you want to contact, use the last name followed by @OEHL.brooks.af.mil

VI. Sample Volumes and Bottles

The sample volume and bottle types differ according to analysis. The following table lists the minimum sample volumes required to perform the specific analysis.

LIQUID SAMPLES

ANALYSIS REQUIRED/		MINIMUM BOTTLE VOLUME REQUIRED
Major Components	500 ml	Glass/with Teflon lined lid
Full Characterization	2 liters, 2 volatile bottles	Narrow mouth glass, precleaned VOA bottles with Teflon lined septum
Energy Recovery	1 Liter	Glass, narrow mouth
TCLP-Full	2 Liters, 2 volatile bottles	Narrow mouth glass, precleaned VOA bottles with Teflon lined caps
TCLP-Metals	1 liter	Glass, narrrow mouth
TCLP-Pestcides	2 liters	Glass, narrow mouth
TCLP-Volatiles	2 volatile bottles	precleaned VOA bottles with Teflon lined septums
TCLP-Semivolatiles	1 Liter	Glass, narrow mouth
BTU Value	1 Liter	Glass, narrow mouth
Ash Content	1 liter	Glass, narrow mouth
SW-8240 (Solvent Screen)	1 liter	Glass narrow mouth
Ignitability	500 ml	Glass, narrow mouth
Reactivity	500 ml	Glass, narrow mouth
pH	100 ml	Glass, narrow mouth
SW-1110 Corrosivity Towards Steel	500 ml	Glass, narrow mouth

SOLID SAMPLES

As a rule, a absolute minimim of 250 grams must be submitted for all analysis requests. The samples, whenever posssible should be placed into glass wide mouth containers with a Teflon lined lid. When submitting large solid samples such as paint booth filters or cleaning cartridges, a large plastic bag may be subsituted for the glass bottle. Ensure that contaminates do not leak or escape from the bag when placing them into to the container.

If "total" values are requested, a much smaller sample volume may be required, contact the laboratory or the appropriate section of this guide for the required amounts.

RECOMMENDED BOTTLES

The Armstrong Laboratory recommends that sample bottles be made of heavy duty clear colorless or amber glass. Precleaned bottles are highly recommended. A plastic outside coating is acceptable. An example of these would be "Boston Rounds" or Q-Pak. The use of the brown "prescription bottles" is not advised due to a high incidence of breakage encountered enroute to the laboratory.

At present, these bottles are not federally stock listed, hovever, they may be ordered through major medical distributors such as Baxter or Fisher Scientific.

Volatile Organic Bottles may be purchased through any major manufacturer distributor as well. It is important that you acquire bottles of good quality and reputation for cleanliness.

VII. Chain of Custody Forms

The proper use of chain of custody form will be discussed fully in its own section of the guide. It should be understood, however, that these forms are required only when the sample analysis data may be used as evidence in litigation. You should consult local, state, MAJCOM and federal guidance prior to collecting any sample to determine if a chain of custody is required.

Many bases currently use the chain of custody forms for "tracking purposes". If this is the case please clearly indicate on both the AF Form 2751 and the Chain of Custody Form that this is the case.

VIII. Quality Control / Quality Assurance

Quality Assurance (QA) can briefly be defined as the process for ensuring that all data and the decisions based on these data are technically sound, statistically valid, and properly documented. Quality Control (QC) procedures are the tools employed to measure the degree to which these quality assurance objectives are met.

A data base cannot be properly evaluated for accuracy and precision unless it is accompanied by quality assurance data. In the case of waste evaluation, these quality assurance data result from the implementation of quality control procedures during sampling and analysis. Quality control requirements for specific analytical methods are given in detail in each method in this manual; in the subsection, quality assurance and quality control procedures for sampling will be discussed.

Quality control procedures that are employed to document the accuracy and precision of sampling are:

1. Trip Blanks: Trip blanks should accompany sample containers to and from the field. These samples can be used to detect any contamination or cross-contamination during handling and transportation.

2. Field Blanks: Field blanks should be collected at specified frequencies, which will vary according to the probability of contamination or cross-contamination. Field blanks are often analyzed to detect any contamination from sampling equipment, cross contamination from previously collected samples, or contamination from conditions during sampling (e.g., airborne contaminants that are not from the waste being sampled).

3. Field Duplicates: Field duplicates are collected at specified frequencies and are employed to document precision. The precision resulting from field duplicates is a function of the variance of waste composition, the variance of the sampling technique, and the variance of the analytical technique.

4. Field Spikes: Field spikes are infrequently used to determine the loss of parameters of interest during sampling and shipment to the laboratories. Because spiking is done in the field, the making of spiked samples or spiked blanks is susceptible to error. In addition, compounds can be lost during spiking, and equipment can be contaminated with spiking solutions. To eliminate these and other problems, some analysts spike blanks or matrices similar to the waste in the laboratory and ship them, along with sample containers, to the field (this approach also has its matrix and the handling of the spikes are different from those of the actual sample). In all cases, the meaning of a low field-spike recovery is difficult to interpret, and thus, field spikes are not commonly used. Due to the complexity and variance between samples submitted, AL/OEA spikes all sample matrix types as part of the analytical procedure. Therefore, concerns about spikes should be addressed to the laboratory. Any and all quality control data from matrix spikes or surrogate recovery can be obtained from AL/OEA on request.

In addition to the above quality control samples, a complete quality assurance program will ensure that standard operating procedures (SOPs) exist for all essential aspects of a sampling effort. SOPs should exist for the following steps in a sampling effort:

1. Definition of objectives.

2. Design of sampling plans.

3. Preparation of containers and equipment (refer to the specific analytical methods).

4. Maintenance, calibration, and cleaning of field equipment (refer to instrument manuals or consult a chemist for cleaning protocols).

5. Sample preservation, packaging, and shipping.

6. Health and safety protocols.

7. Chain-of-custody protocols. In addition to the above protocols, numerous other QA/QC protocols must be employed to document the accuracy of the analytical portion of a waste evaluation program.

IX. AF Form 2751

The AF Form 2751 will soon be upgraded to reflect new data processing technology. Until the form is readily available the following instructions should aid you in correctly filling out the form.

The top part of the form is self explanatory. However, it is very important to fill out all the blocks. Failure to do this will prevent the laboratory from maintaining a complete and valid database concerning your sample. Probably the most important information on the top half of the form is the base code and mailing address. For us to ensure delivery of your data this information is vital. Additionally, the source being sampled should be filled out as completely as possible. This information greatly aids the analyst in identifying your waste material thus expediting the analysis.

The center section of the form is very important to ensure that you get the analysis required. The following describes how to fill out this form:
Major Components - Check if you require the sample to be identified to 1% by volume.

B, C, D Lines - Write in any single or special analysis required, i.e. TCLP-Full, Energy Recovery,TCLP-volatiles, SW-8240, SW-8020 (BETX), etc.

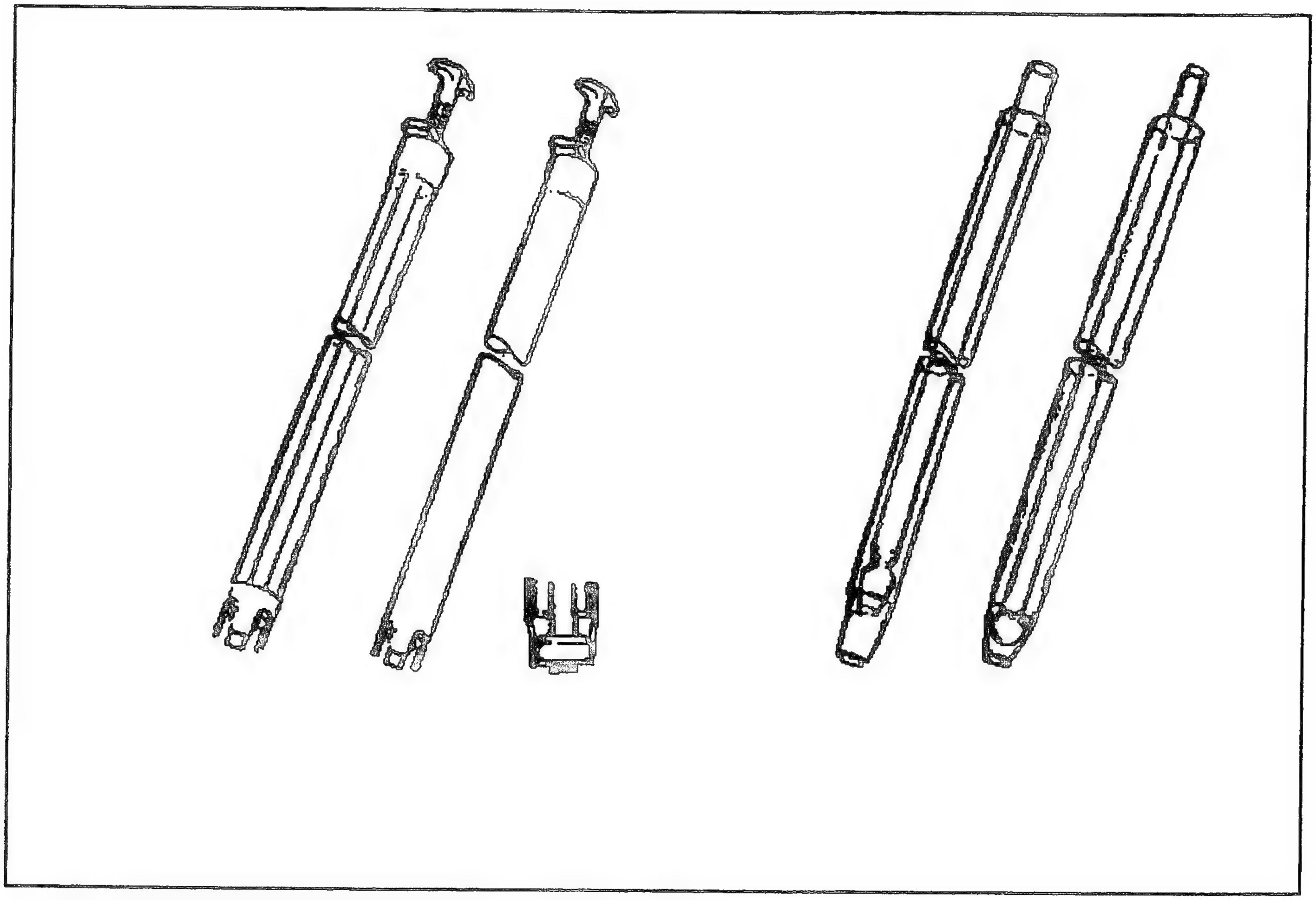
Hazardous/Toxic Waste Block: Checking this block will provide the following: TCLP-Metals, pH, Reactivity, Major Components, and Ignitability on applicable sample matrixes

If you require a full characterization of the sample simply check the Hazardous/Toxic Waste block and write TCLP-Full on the B or C line. This will provide data on all RCRA Characteristics listed in 40 CRF part 261.

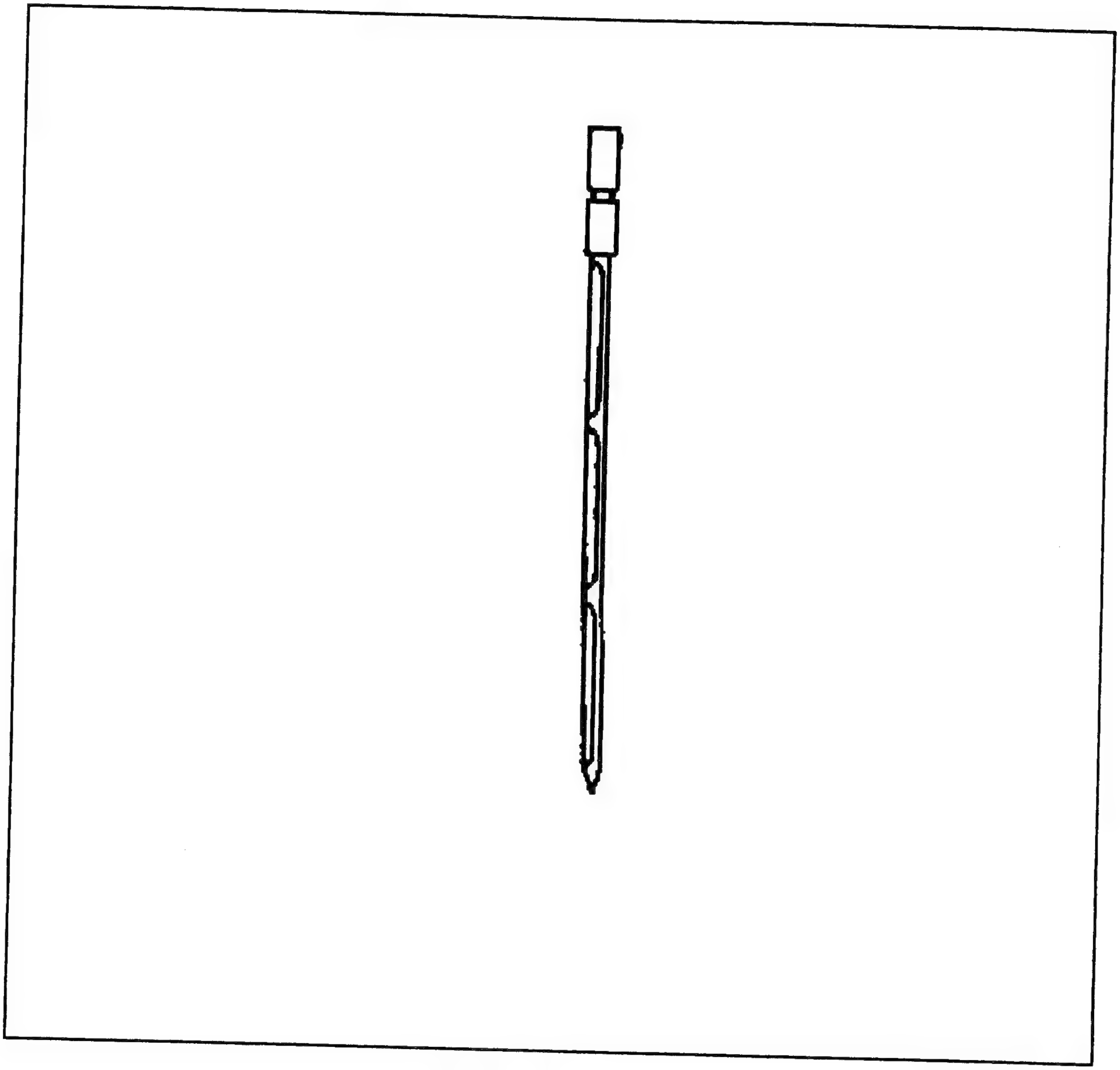
The bottom section of the form is also self explanatory, again, the information you provide is very important to us at the lab. This information is used to help identify and classify the material. However, only fill in the requested information if you are certain that is correct. Guessing at this information or copying it off a waste drum will not assist us in analysis it will only delay getting your data to you.

The comments section can be used to add information about the sample and make special requests. We recommend that you indicate if this sample is a Priority in this area. Also include information concerning any presubmission coordination that may have been made with laboratory personnel. Indicate who you talked to and what request was made.

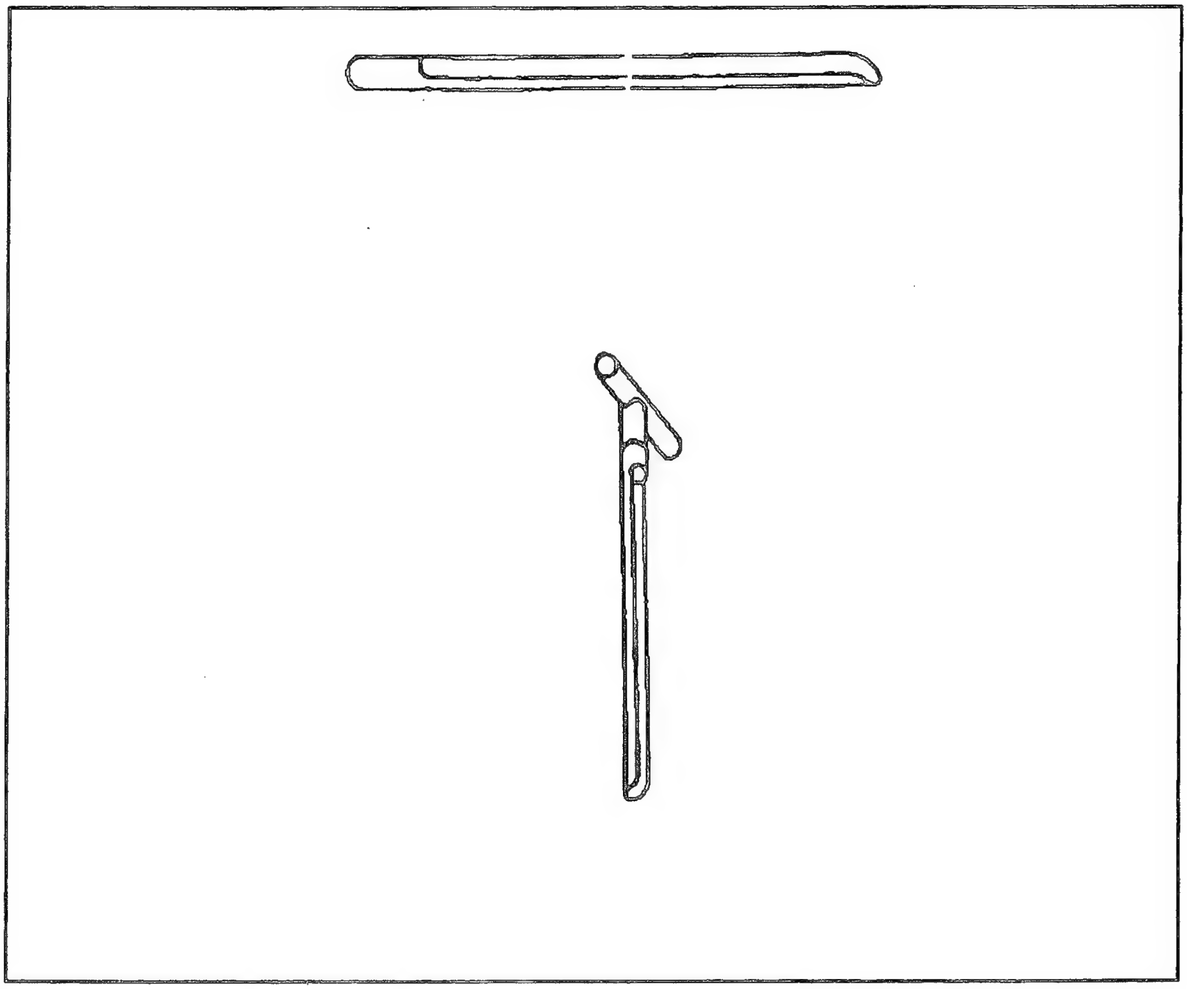
Lastly, when shipping your sample, please ensure that the AF Form 2751 accompanies your sample to the laboratory. A sample without a request form, or a request form with no sample can not be analyzed.



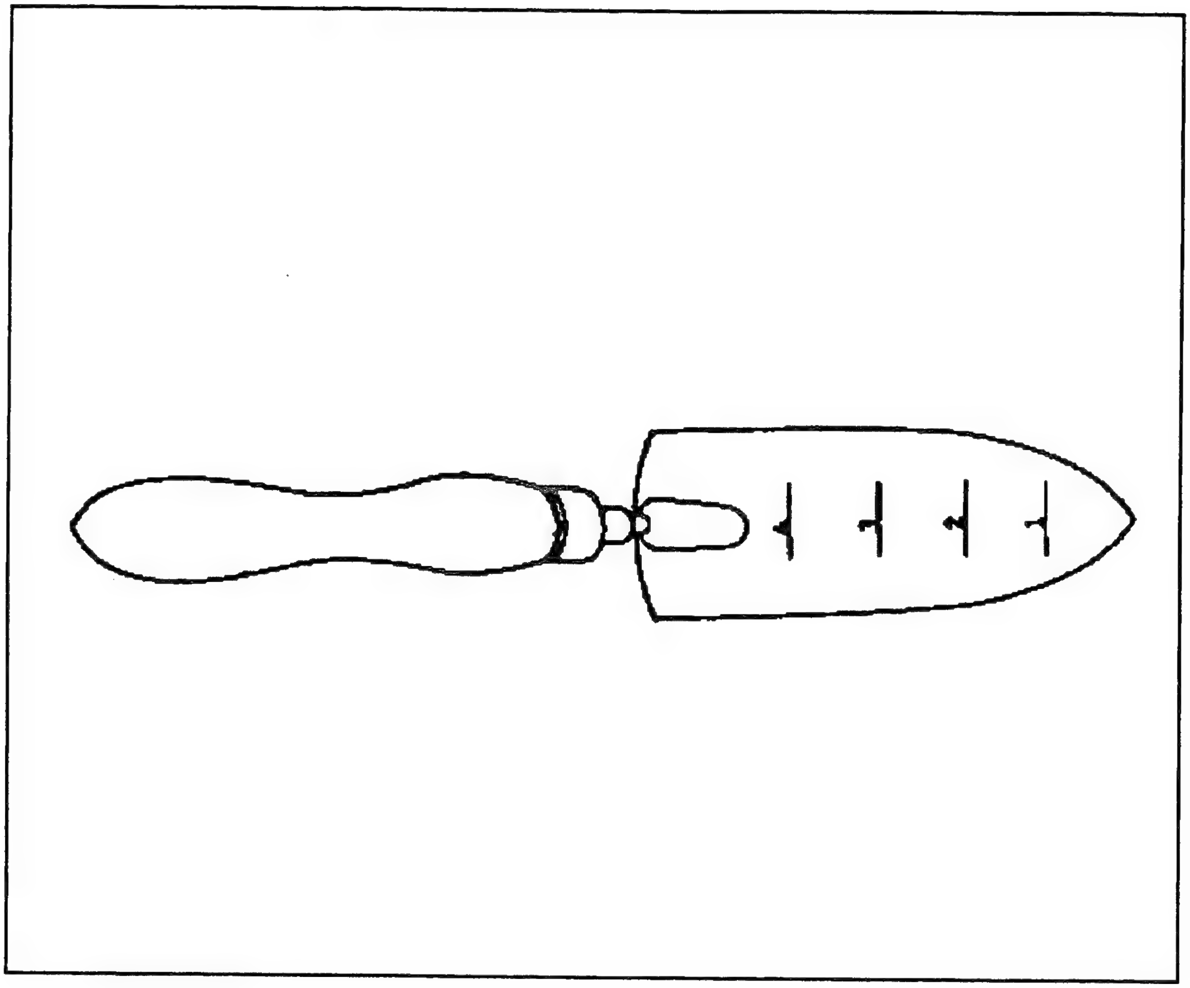
CALIWASA



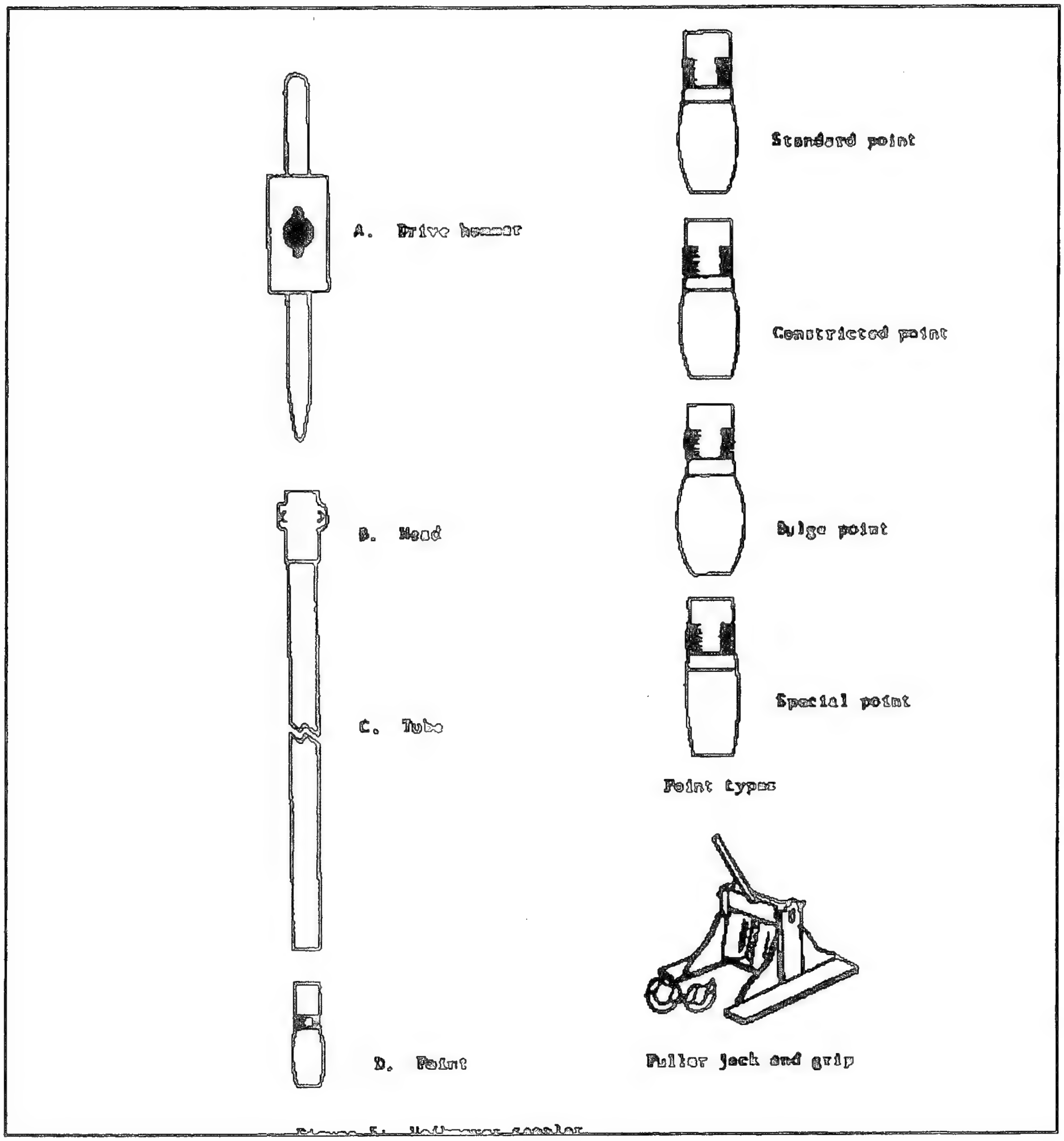
THIEF SAMPLER



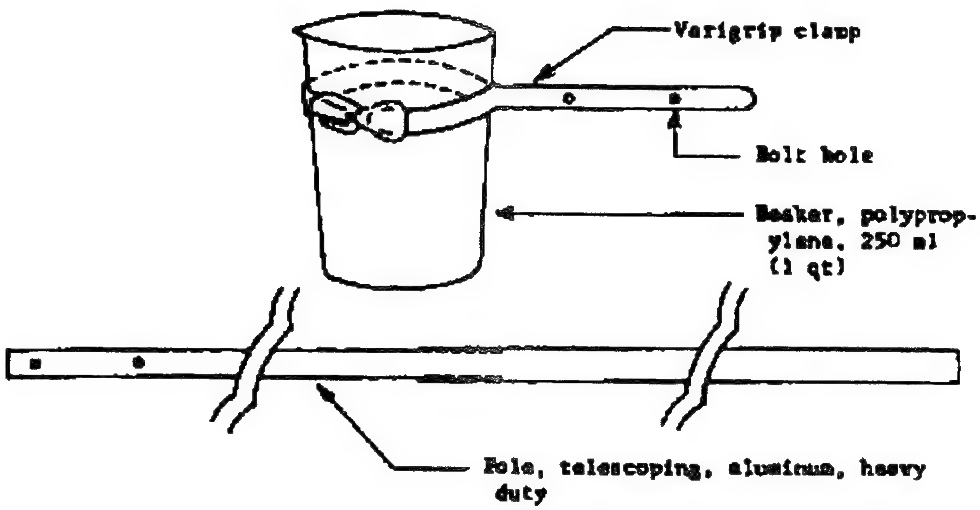
TRIER



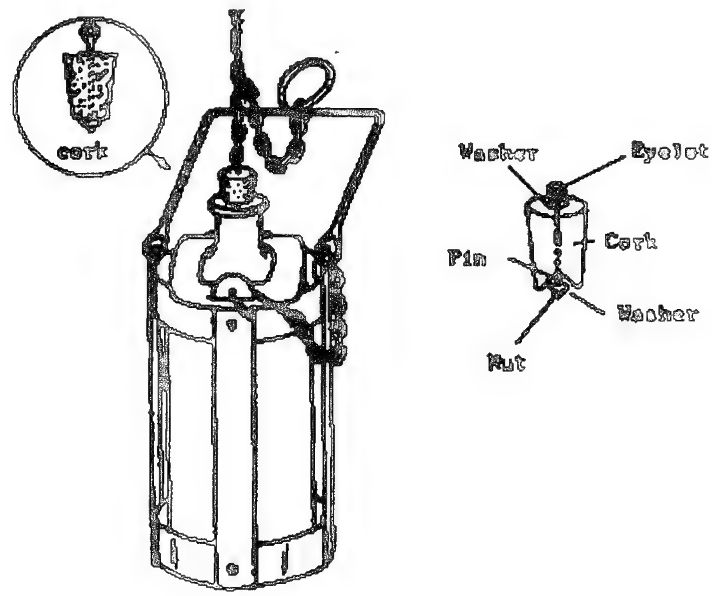
SCOOP



VIEMEYER SOIL SAMPLER (Core Sampler)


Varigrip clamp
Bolt hole
Beaker, polypropylene, 250 ml
(1 qt)
Pole, telescoping, aluminum, heavy
duty

DIPPER



WEIGHTED BOTTLE

THE FOLLOWING IS A LIST OF ANALYTES IN THE TCLP PROCEDURE. THE LIST HAS BEEN BROKEN DOWN INTO GROUPS FOR THE PURPOSE OF ANALYSIS.

METALS	VOLATILES	METHOD
ARSENIC	BENZENE	SW8240
BARIUM	CARBON TETRACHLORIDE	"
CADMIUM	CHLOROBENZENE	"
CHROMIUM	CHLOROFORM	"
LEAD	1,2, DICHLOROETHANE	"
MERCURY	1,1, DICHLOROETHYLENE	"
SELENIUM	METHYL ETHYL KETONE	"
SILVER	TETRACHLOROETHYLENE	"
	TRICHLOROETHLENE	"
	VINYL CHLORIDE	"

PESTICIDES	METHOD
CHLORDANE	SW8080
ENDRIN	"
HEPTACHLOR	"
LINDANE	"
METHOXYCLHOR	"
TOXAPHENE	"

SEMI-VOLATILES	METHOD
1,4 DICHLOROBENZENE	SW8270
2,4 DINITROTOLUENE	"
HEXACHLOROBENZENE	"
HEXACHLOROBUTADIENE	"
HEXACHLOROETHANE	"
NITROBENZENE	"
o-CRESOL	"
m-CRESOL	"
p-CRESOL	"
PENTACHLOROPHENOL	"
2,4,5 TRICHLOROPHENOL	"
2,4,6 TRICHLOROPHENOL	"

HERBICIDES	METHOD
2,4-D	SW8150
2,4,5-TP	SW8150

1. *How do I collect a sample for TCLP analysis?*

The sample required for the TLCP depends upon the physical state or states of the waste and the contaminants of concem. Generally, for a solid sample, 250 grams in a wide mouth glass container is required. For liguids or multi-phasic samples (liguid/solid mixtures), two 1-liter aliquots in a glass container with a teflon lined cap is called for. If you need the TCLP volatile screen, two 40-ml volitile organic bottles with teflon septums must be included and you need to send the samples to us ovemight mail to ensure we have enough time to process and extract the sample before the 14-day limit. To prevent loss of contaminates, it is essential that no air space be present in the bottles. Refer to the table below for further information:

Contaminate of Concern	Size of Sample	Container Type
Full TCLP (Liguid)	2000ml	Two 1-liter Glass 2-40ml Vials
VOC (Solid)	250 grams	Wide Mouth Glass
TCLP Metals (Liguid)	1000ml	Glass
(Solid)	250 grams	Wide Mouth Glass
TCLP Metals & Pesticides		

(Liguid)	2000ml	Two 1-liter Glass
(Solid)	250 grams	Wide Mouth Glass

It should be noted that the bottles be colorless and made of sturdy glass. We recommend Qorpak brand or equivalent. These are available from most of the major medical suppliers.

2. *Can I request just the metals protion on the TCLP?*

   Yes, you may request just the metals portion or any other portion that concerns you. Be sure to specify on the AF Form 2751 which area you require. If it is not specifically indicated, a full TCLP will be performed. The cost of the TCLP Metals Screen is around $400.00.

3. *Who do I call if I have Further questions?*

   In the Analytical Division, MSgt Mike Wantland (DSN240-3626) and in the Bioenvironmental Engineering Division any of the hazardous waste consultants (DSN240-3305).

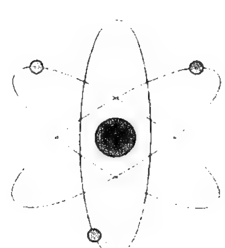
Armstrong Laboratory
Bioenvironmental Engineering
Division

Directory of
Radiation Related Services

Directory of
Radiation Related Services

The Bioenvironmental Engineering Division, Armstrong Laboratory, is staffed with a full complement of personnel and facilities to address your environmental and occupational requirements as they pertain to a variety of bioenvironmental problems; including but not limited to ionizing and non-ionizing radiation. Within the Bioenvironmental Engineering Division, there are three separate branches to facilitate your access to radiation related services. In addition, there are two additional separate divisions that handle the non-ionizing radiation issues. These divisions are the Radiofrequency Radiation Division (AL/OERS) and the Optical Radiation Division (AL/OEO). Listed in the following pages you will find a brief explanation of the mission of each of the separate branches and the location of more detailed information concerning services of that branch.

Table of Contents



Health Physics Branch (AL/OEBZ)

Mission Statement: Provides laboratory and field consultation services in support of the USAF worldwide ionizing radiation protection programs identified in AF Occupational and Safety and Health (AFOSH) series regulations. Ionizing radiation services include: on-site field surveys to evaluate and augment ionizing radiation protection programs required of AF commanders under 10CFR20 and 29CFR40-200; consultations concerning the licensing of radioactive materials and their storage, handling, and disposal in accordance with AFI 40-201, Managing Radioactive Materials in the Air Force; investigations of incidents involving suspected internal or external exposure of individuals to ionizing radiation; medical/dental x-ray compliance survey required by JCAHO and NCRP 99; fetal dose evaluations; shielding evaluations; consultations on radioactive waste site remediation and facility decommissioning and decontamination; radiation surveys of nuclear weapons in support of the Intrinsic Radiation (INRAD) Program in AFR 122-14; assessment of radon levels in Air Force-owned structures in support of the Radon Assessment and Mitigation Program (RAMP) as required by the 1987 Implementation Plan signed by HQ USAF/CVA; consultation on facility decommissioning; evaluation of RADIAC equipment; and management of the Air Force Radiation Assessment Team (AFRAT).

Description of Capabilities: The following the current capabilities of AL/OEBZ.

- Joint Commission on Accreditation Healthcare Organizations (JCAHO) surveys on medical, dental and mammography diagnostic x-ray equipment.

- Technical consulting regarding ambient and indoor radon concentrations and radon sampling strategies.

- Health Physics services to include: telephone consults regarding permit issues, disposal of radioactive waste, overexposure calculations, decommissioning surveys.

- Health Physics Emergency Response to incidents/accidents involving radioactive material.

- Air Force Radiation Assessment Team (AFRAT) deployment in the event of a nuclear weapon incident/accident.

Description of Services: The Armstrong Laboratory Occupational and Environmental Directorate, Health Physics Branch, (AL/OEBZ) provides the following levels of support to Air Force Center for Environmental Excellence (AFCEE), Radiation Safety Officers, Bioenvironmental Engineers, Base Realignment and Closure (BRAC) Managers, and Environmental Management Offices.

<u>LEVEL 1:</u> In-house Medical and Health Physics consult issues:

a. Review of Site Remediation Documentation to include Statements of Work (SOW) & Work Plans.
b. Technical guidance concerning industrial/environmental monitoring of radioactive materials.
c. Technical guidance regarding packaging, shipping, and disposal of radioactive material.
d. Technical guidance regarding field instrumentation capabilities.
e. Survey procedures for Medical and Dental X-ray equipment.
f. Occupational and non-occupational radiation dose assessments.
g. Radon sampling and mitigation strategies.
h. Shielding determinations for medical/dental/industrial x-ray or sealed source operations.

<u>LEVEL 2:</u> On-site Surveys

a. Characterization surveys of radioactive contaminated sites to include underground storage tanks (UST) and burial site exhumation.
b. Radiological decommissioning surveys of nuclear facilities.
c. Health Physics Emergency Response to incidents/accidents involving radioactive material.
d. Air Force Radiation Assessment Team (AFRAT) deployment in the event of a nuclear weapon incident/accident.

e Shielding Evaluation and Program Review of Non-Destructive Inspections (NDI) Facilities.
f. Joint Commission Accreditation on Healthcare Organizations (JCAHO) surveys of Medical & Dental x-ray units.

Access to Services: All services can be accessed by contacting AL/OEBZ at the following telephone numbers. A letter or FAX requesting our services will be required for services that cannot adequately be addressed by a telephone consultation.

Mailing Address:

AL/OEBZ
2402 E. Drive
Brooks AFB, TX 78234-5114

Telephone Numbers:

DSN: 240-3486
COM: (210) 536-3486

FAX Number:

DSN: 240-2288
COM: (210) 536-2288

Radiation Dosimetry Branch (AL/OEBD)

Mission Statement: To support the Air Force and DoD in personnel dosimetry services using thermoluminescent dosimeters (TLDs) to meet 10 CFR 19, 20, 30-36, 40 and 70; to provide dosimetry service for environmental monitoring with TLDs to determine quantitative and qualitative ambient levels of radiation.

Description of Capabilities: The following are the current capabilities of AL/OEBD:

•Personnel whole body and extremity monitoring for beta,gamma, and x-ray.

•Personnel neutron monitoring for fast, intermediate or thermal neutrons.

•Increased monitoring and faster dose response for declared pregnant females.

•Administrative, radiation and public area monitoring with TLDs (climate controlled environments).

•Environmental monitoring using TLDs in external areas; not climate controlled.

•All monitoring provided for monthly or quarterly periods.

•Exposure reproduction using TLDs with gamma, x-ray or beta irradiation systems available at Instrumentation Calibration Facility (ICF).

•All services NIST traceable and NVLAP certified.

Description of Services: The Armstrong Laboratory Occupational and Environmental Directorate, Radiation Dosimetry Branch, (AL/OEBD) provides the following levels of support to Radiation Safety Officers (RSO) and Bioenvironmental Engineers worldwide.

<u>LEVEL 1:</u> We supply personnel dosimetry support to personnel as required by 10 CFR 20 as well as x-ray technicians and any other personnel requested by the base TLD monitor.

<u>LEVEL 2:</u> We supply TLDs for use as interior monitors. Also supplied are external environmental and area monitors. These TLDs shall be processed and results including deep, eye and shallow dose shall be returned to RSO for interpretation. This service offers the opportunity for long term testing of radiation levels to determine annual compliance.

<u>LEVEL 3:</u> We provide TLDs for use in a Broken Arrow accident or accidents involving radioactive material. Our services can process these badges immediately upon receipt for fast, accurate dose reports.

<u>LEVEL 4:</u> We can support any suspected overexposure by reading the specified TLD immediately upon receipt and dosing the results separately. Results shall be faxed or phoned to the waiting RSO.

Because our manpower and resources are limited, we must satisfy the personnel monitoring requirements prior to any environmental or area monitoring support. This is normally not an issue, but personnel dosimetry is the Federally Mandated program supported by the USAF Personnel Dosimetry Branch.

Once it is determined that area or external dosimetry is necessary, request the number of TLDs required by FAX or letter. Please include if the TLDs will be in climate controlled or outside environments. Follow the same monitoring period time frame as personnel dosimetry, Request TLDs 2 - 4 weeks in advance and always designate a control badge.

The Radiation Dosimetry Branch thanks you in advance for doing everything you can to follow the correct procedures. This will allow us to do everything we can to minimize turn-around-time for your radiation exposure reports.

Description of Equipment: The following tools and equipment are used to provide accurate dosimetry service:

•UD 716 Panasonic Reader System

•UD 802 Panasonic Thermoluminescent Dosimeters (gamma, x-ray, beta, thermal neutron)

•UD 807 Panasonic Thermoluminescent Dosimeters (gamma, x-ray, beta extremity)

•UD 809 Panasonic Thermoluminescent Dosimeters (gamma, fast neutron)

•Harshaw 100 reader and extremity thermoluminescent dosimeters (gamma, x-ray, beta)

Access to Services: All services can be accessed by contacting AL/OEBD at the following telephone numbers. We will request a letter or a fax from you in addition to the telephone call for our records under you account code. In addition, you may request a copy of the USAF Personnel Dosimetry Manual. This manual gives detailed instructions pertaining to your successful management and oversight of the dosimetry program at your facility. However, the USAF Personnel Dosimetry Manual is updated independently of the AL Sample Guide. Please contact AL/OEBD to ensure that you have the most current guidance.

Mailing Address:

AL/OEBD
2402 E. Drive
Brooks AFB, TX 78235-5114

Telephone Numbers:
DSN: 240-2376
COM: (210) 536-2376

FAX Number:
DSN: 240-2288
COM: (210) 536-2288

Radioanalytical Branch (AL/OEBA)

Mission Statement: To support the Air Force and DoD facilities world wide in occupational and environmental health programs; to determine qualitative and quantitative levels of radioactivity in all types of samples using state of the art technology and evaluating the effects on the environment and personnel.

Description of Services: The following radioanalytical services are provided by AL/OEBA. Our analytical capabilities are as follows:

- **Gross Alpha/Beta/Gamma Counting**
- **Gamma Spectroscopy**
- **Alpha Spectroscopy**
- **Liquid Scintillation**
- **^{226}Ra and ^{228}Ra Determinations**
- **^{89}Sr and ^{90}Sr Determinations**
- **Diffusion Membrane Canister for Rn^{222} concentrations (RAMP)**

In addition, AL/OEBA is certified by the U.S. Environmental Protection Agency (EPA) and uses EPA recognized analytical procedures as applicable. AL/OEBA actively participates in the U.S. EPA sponsored Environmental Monitoring Systems Laboratory (EMSL) intercomparison studies program as well as other quality assurance cross-check analysis programs sponsored by other recognized laboratories. AL/OEBA also maintains state certifications with most states that have recognized certification programs. Contact the NCOIC, AL/OEBA for specific information.

These capabilities are used to support various occupational and environmental programs in addition to a wide range of sample types for most radioanalytical requirements and scenarios. These programs, scenarios, and sample types are as follows:

- **Routine Background/Periodic Survey**
- **CWA**
- **CAA**
- **EPA Compliance**
- **RCRA/(IRP)**
- **DERA**
- **NPDES**
- **BRAC**
- **RAMP**
- **Accident/Incident**
- **Followup/Cleanup**
- **Other**
- **Water** (Includes the following programs or requirements):
    - Safe Drinking Water Act (SDWA) - ***Including ^{222}Rn in Water***
    - Nonpotable/Potable
- **Air Sampling** (Including Ambient Air or Source Emission Samples)
- **Soil/Sludge/Ash/Residue**
- **Vegetation**
- **Industrial Materials**

- **Bioassay and Internal Dosimetry:** The following media are analyzed routinely in support of DoD Occupational Radiation Safety Programs to quantify the magnitude of radionuclide intake and determine the resultant Committed Effective Dose Equivalent associated with the intake. The following sample types are normally submitted for routine bioassay programs:

  - **Urine**
  - **Feces**
  - **Radon Breath Bags**
    (For Determination of Total ^{226}Ra in the body)
  - **Breathing Zone Air Filters**
  - ***In-Vivo* Whole Body Counting**
    (Requires the subject to travel to AL/OEBA)
  - **Nasal Swabs (Note: Nasal swabs are only an indication of possible exposure. Do not submit nasal swabs as a stand alone bioassay evaluation tool.)**
  - **Breathing Zone Air Filters**

Access to Services: Radioanalytical Branch services can be obtained by following the instructions located in Appendices A through C of this guide. Please refer to this section for sample collection instructions, requesting analyses, and pertinent details regarding radioanalysis.

Mailing Address:

AL/OEBA
2402 E. Drive
Brooks AFB, Texas 78235-5114

Telephone Numbers:

DSN: 240-2061/2062
COM: (210) 536-2061/2062

FAX Number:

DSN: 240-2288
COM: (210) 536-2288

Optical Radiation Division (AL/OEO) Consulting Branch

Mission Statement: Provides consulting services and technical assistance on all matters relating to optical radiation safety to Air Force units throughout the world.

Description of Services: We provide technical support on all aspects of optical radiation safety such as complex hazard evaluations, systems output measurements, overexposure investigations, environmental impact statements (EIS), range laser surveys etc. We also prepare Air Force standards for optical radiation safety, and we write guidelines to assist bioenvironmental engineers with the base-level management of the optical radiation program. Finally, we maintain the USAF optical radiation overexposure database.

Level 1: We supply technical guidance on specific optical radiation topics that should provide base-level personnel with the tools and knowledge necessary to resolve many issues on their own. This includes shipments of documentation, technical reports etc.

Level 2: We provide off-site consultation via telephone, fax, mail.

Level 3: We provide on-site consultation for short periods of time (1 day to 2 weeks) when levels 1 and 2 fail to produce a solution.

Because our manpower resources are limited, we rely on our customers to do everything they can to resolve their optical radiation safety issues using their base resources supplemented by our off-site consultation services (levels 1 & 2). If this effort fails, we are prepared to provide level 3 on-site consultation. However, because our manpower resources are so limited, we often have an on-site visit schedule backlog, and need to prioritize requests. Prioritization factors are impact on the Air Force Mission, applicability of the project to other AF units (i.e., if the experience gained improves our ability to advise other bases, the priority is higher), complexity and length of the project, the level of effort already put forward by the base (more effort means higher priority). Because our budget is limited, we also will prioritize the available funding of our off-site consultations and may ask the customers to pay our TDY costs.

Access to Services (AL/OEO):

To request our Level 3 services, send a letter of request to us (AL/OEO) through your MAJCOM BEE with a copy to HQ AFMC/SGB.

Mailing Address:

AL/OEO (Attn: Capt Barrett)
8111 18th St
Brooks AFB, TX 78235-5215

Phone #:

DSN 240-4784/85
(210)536-4784/85

Fax #:

DSN 240-3903
(210)536-3903

Thank you for following the above procedures. This will enable us to provide you with the best consultative support possible on extremely limited resources.

Radiofrequency Radiation Division (AL/OER)

The Radiofrequency Radiation Division of the Occupational Environmental Health Directorate (OE), Armstrong Laboratory, consists of four separate branches; the Sources & Measurements Branch (AL/OERS), Biological Effects Branch (AL/OERB), Performance Extrapolation Branch (AL/OERP), and Biotechnology Branch (AL/OERT). Our mission is to investigate the biological effects of radiofrequency radiation (RFR) in Air Force operations and evaluate the potential health hazards to our workforce and the general public. We are a leading DoD research facility tasked to support current and future requirements for manned operations.

Sources & Measurements Branch (AL/OERS)

Mission Statement: Provide the technical advice and support necessary to establish and maintain effective radiofrequency radiation (RFR) protection programs. Guide and assist base bioenvironmental engineers, field units, and other organizations with the implementation of Air Force policy to protect personnel and the general public from exposure to RF radiation. Ensure that survey and measurement expertise is made available to field operations to adequately evaluate the workplace for hazards associated with the use of RF radiation.

Description of Services: Our consultants are available to provide hazard assessments of emitter systems and to specify the required control measures. We provide expertise and assistance with overexposure investigations, on-site measurements, Environmental Impact Statements (EIS), environmental risk assessments, and hazard communications. One of our unique requirements is the maintenance of the USAF RFR overexposure data base. We also maintain copies of technical survey reports, a corresponding data base containing measurement data, and a data base listing of RFR survey reports that are available from the Engineering Installation Group, 1839th EIG, Keesler AFB MI. We have ready access to equipment nominal characteristics files from the Electromagnetic Compatibility Center (ECAC) for the purpose of assisting you with your inventory needs. We prepare Air Force Standards for controlling exposures to RFR and write guidelines for bioenvironmental engineers to assist with the base level management of effective RFR protection programs. For additional information regarding the management of RFR or applicable standards, see AFOSH Standard 161-9 and USAFOEHL Technical Report 89-023, Base Level Management of Radio Frequency Radiation Protection Program. Copies of the latter can be obtained by contacting AL/OERS.

Access to Services (AL/OER):

Mailing Address:

AL/OERS
8305 Hawks Road, Bldg 1182
Brooks AFB, TX 78235-5324

Telephone Number:

DSN: 240-3179/1182
Commercial: (210) 536-3179/1182

FAX Number:

DSN: 240-3977
Commercial: (210) 536-3977

Appendix A
Radiological Sampling Instructions

INTRODUCTION

The purpose for the collection and analysis of samples is to provide numerical data which describes a particular situation. The results obtained may then be utilized as a basis for the formulation of a course of possible action. The goal of any sampling and analysis program is the generation of results which accurately represent the real situation. The attainment of this goal requires that equal attention be accorded the collection, storage and handling of samples, as well as to the actual analytical process. The reliability of any analytical results is only as good as the quality of the sample submitted. A properly completed AF Form 2753 must accompany all samples submitted for radioanalysis, except for swipe samples, which are to be submitted using AF Form 495. See Appendix B for instructions for completing AF Form 495, and Appendix C for instructions for completing AF Form 2753.

In order to provide you better service, all samples are processed as routine ***unless priority analysis is specifically requested, in writing,*** by the individual responsible for directing the sampling. Priority analysis is normally granted without questioning the customers justification. Accordingly we request that you limit your priority requests to situations directly effecting human health or safety. Please note that correspondence regarding samples for radioanalysis must be addressed to the Radioanalytical Branch of Radiation Services (AL/OEBA), rather than AL/OEA.

ASSIGNMENT OF BASE SAMPLE NUMBERS

Radiological samples that are collected at base level must be assigned a sample number regardless of whether they are analyzed locally or at a central laboratory. This coded sample number will enable the analysis results to be ultimately stored in and retrieved from a central data repository. A sample number consists of eight digits. The first two digits classify the sample as to the collection method and sample type. The next two digits identify the calendar year the sample was taken. The last four digits identify the locally assigned number, progressing in numerical sequence from sample number 0001 to number 9999. This sequence should be started over with each new calendar year.

a. Digit 1--see codes on AF Form 2753 or in AFI 161-17.

b. Digit 2--see codes on AF Form 2753 or in AFI 161-17.

c. Digits 3 and 4--code for year sample is collected, e.g., 94 for 1994.

d. Digits 5-8--the locally assigned sequence number.

SAMPLING TECHNIQUES

1. **BIOLOGICAL SAMPLES**

a. **Nasal Swabs**--Nasal swabs are not indicated under normal occupational monitoring conditions. It is not possible to determine the total intake for an individual by a nasal swab alone. The normal use of a nasal swab is under extreme accident-type (example: nuclear weapons or reactor accidents) conditions to determine which individuals were exposed to the greatest concentrations and hence, at the greatest risk of intake. In order for a nasal swab to provide meaningful data, the sample **must** be collected within one hour of the termination of exposure. There is no such thing as a *pre-exposure* or *baseline* nasal swab. A cotton-tipped applicator, FSN 6640-00-729-6484, moistened with water, is recommended for taking nasal swabs. If these applicators are not available, any moistened cotton swab may be substituted. Use a separate applicator for each nostril. Do not use tubes with culture media. After taking the sample, place each applicator in the culture tube or a glassine bag, then place the tube or bag in an envelope. Label sample with identifying information: name, rank, Social Security Number (SSN), home base and organization. Note that each swab (one per nostril) is a separate sample, with it's own base sample number and completed AF Form 2753.

b. **Urine**--Unless otherwise recommended by AL/OEBA, urine specimens should consist of total output for a period of 24 hours taken in the following manner: Discard first morning voiding and collect all other voidings during the next 24 hours, including the first voiding the following morning. The normal 24 hour urine total volume is 1000-2000 ml. Collections should be made in a special plastic bottle supplied by the Laboratory. Do not add any chemical or reagent as a preservative. Shipment of sample, properly identified, should be accomplished as soon as possible.

c. **Breath**--This Laboratory maintains a capability to support the collection and submission of human breath samples for the total activity of ^{226}Ra (radium) in the body by specific analysis of ^{222}Rn (radon), a decay product of ^{226}Ra (radium). Requirements for this service should be directed to AL/OEBA {DSN 240-2061 or (210) 536-2061/2062}.

d. **Fecal or Other**--Please call us for specific instructions.

2. **ENVIRONMENTAL SAMPLES**

a. **Soil**--Soil sampling procedures depend on the purpose of the sampling program. In all cases, careful selection of control (background) samples is required to allow interpretation of results. The following minimum quantities are necessary for analysis:

(1) Gamma spectrometry plus gross alpha and/or gross beta--two kilograms of soil (approximately one square foot area three inches deep).

(2) Gross alpha and/or gross beta only--100 grams.

(3) For a specific alpha and/or beta radionuclide, particularly ^{239}Pu (plutonium)--consult AL/OEBA {DSN 240-2061 or (210) 536-2061/2062}.

(4) For information about suitable soil sample containers - see "Labeling, Containers and Shipping Methods," Appendix A, page A-6, para 2.b(1).

b. **Water**--

(1) Surface and/or waste discharge sources--at least two liters--the entire sample may be in one container.

(2) For information about suitable water sample containers - see "Labeling, Containers and Shipping Methods," Appendix A, page A-6, para 2.a.(2)

c. **Vegetation**--The minimum sample volume is three liters of densely packed sample and should be double plastic bagged or packed in a one-gallon wide-mouth plastic jar.

d. **Air**--Air samples may be collected, using a Staplex or other suitable high-volume sampler.

(1) Place a small "x" IN PENCIL ONLY on the outer edge of the "exposed" side of the filter paper.

(2) After sampling, insert the sample filter ***unfolded*** into a glassine or plastic bag, and then into an outer envelope for shipment. The outer envelope should be marked with the submitting base, the base sample number and all other identifying information.

(3) Ensure that a properly completed AF Form 2753 (see Atch VII-A2-3) accompanies the sample, and includes the start and stop date and time, total sampling time, and volume of air sampled in cubic meters, corrected for standard conditions (see Atch VII-A2-3 para 11d).

e. **Radon by Charcoal Canister**--Charcoal canisters are available from AL/OEBA for special occupational radon surveys. Call us at DSN 240-2061 if you think you may need this service.

(1) The radon charcoal sampler is used to get an integrated measurement for the radon concentration in an area over a 7 day period. The sampler should normally be exposed for a seven day period.

(2) We recommend that the area be sampled under "closed" conditions This means that the building should be closed, except for entering and leaving, for a 12 hour period before beginning the sampling, and for the entire 7 day sampling period. During this period you should not leave any windows or doors open, don't operate attic fans or air cleaning devices, and don't operate any window fans or air conditioners. Also, do not attempt the sampling if the building is undergoing remodeling or the exterior shell is being modified.

3. **DRINKING WATER**

a. Samples for Radiological Drinking Water Standards--AF Reg 161-44 - four liters.

b. In order to comply with the provisions of the safe drinking water act, preservative must be added to the sample at the time of collection to ensure that the sample has pH 2 or less. In order to insure that this requirement is accomplished, add 5 milliliters of concentrated nitric acid per liter of sample. This applies to all samples, except Radon-222 in water, that are collected in plastic or glass and sent to the laboratory.

c. Other than AF Reg 161-44 compliance--four liters.

d. For information about suitable water sample containers--see "Labeling, Containers and Shipping Methods," Appendix A, page A-6, paragraph 2.a.(2).

e. For analysis of Radon-222 in water contingent to the Safe Drinking Water Act, contact AL/OEBA for a sample kit and special instructions for this test. ^{222}Rn in water is a disolved gas and requires special collection technique, handling, and expeditious analysis by AL/OEBA. ***Please do not attempt this procedure without coordinating with AL/OEBA.***

4. **SWIPE COLLECTION PROCEDURES**

a. Use filter paper disc (Whatman No. 41 or equal), 4.25 cm or less in diameter. The only exception is that cotton tip applicator sticks may be used for swipe samples of Cesium-137 sources taken in accordance with A.F.T.O. 11H4-8-5-1. The filter papers are standard non-medical items. The procurement source is the Whatman Catalog, Catalog No. 1001M042. The Whatman Company can be reached at 1-800-Whatman.

Please do not use swipe papers with "sticky" backs. These swipes foul our counting systems and take additional technician time.

b. Place a small "x" IN PENCIL ONLY on the outer edge of the filter paper on the side which is to touch the radioactive source or area being tested for contamination.

c. Each swipe should be taken from an area of 100 square centimeters by gently rubbing two or three times with the dry filter paper disc or cotton tipped applicator.

d. Place the dry, unfolded disc (or cotton tip stick) in the envelope (AF Form 495) (applicator sticks may be broken if necessary). Leave the AF Form 495 unsealed.

e. Complete the AF Form 495 per instructions in Appendix B. **DO NOT submit an AF Form 2753 for swipe samples.**

f. Place the AF Form 495 into another plain envelope for mailing. The use of cardboard or metal mailing tubes is not necessary. In addition, please do not use the AF Form 495 as a mailing envelope.

5. **OTHER**. AL/OEBA performs radionuclide analysis on other types of samples such as other body fluids, industrial products and/or chemicals. Specific instructions may be obtained by consulting AL/OEBA {DSN 240-2061/2062 or (210) 536-2061/2062}.

LABELING, CONTAINERS AND SHIPPING METHODS

Shipping and storage of any sample prior to analysis requires careful attention to avoid the loss of certain radionuclides, spoilage, and/or decomposition. This laboratory recommends the use of plastic containers whenever possible, for all radiological sampling techniques. Containers for the shipment of each type of sample are discussed in paragraph 2 below.

1. **LABELING** Each sample submitted (except swipes) must be properly identified and accompanied by an AF Form 2753, Radiological Sampling Data, accurately completed with the requested information. Submit swipe samples with AF Form 495, Swipe Container. AF Forms 2753 and 495 are supplied by the Base PDO. It is very important that information describing the situation be included. In the case of biological samples (body fluids, breath, nasal swabs, etc.) information on dates of possible exposure, dates of sampling, etc., are an absolute necessity.

2. **SAMPLING/SHIPPING CONTAINERS** The AL/OEBA maintains a supply of containers for most environmental and biological sampling. We will send a supply of containers immediately to any area, upon request, when an ***emergency*** need exists. Most of your routine sampling container and supply needs should be filled through your normal supply channels.

a. **Liquids**--

(1) **Urine**--A special plastic container designed for the collection and submission of urine samples will be supplied, upon request, by AL/OEBA. The sample should be packaged in a cardboard shipping box. In urgent situations, the one-gallon cubitainer may be substituted.

(2) **Water and other liquids**--Collapsible plastic containers, plus cardboard shipping carton (Cubitainer) have been found to be most suitable for water samples; one-gallon FSN 6640-00-117-7855, one-quart FSN 6640-00-117-8042. Additional protection during shipment may be obtained by inserting the Cubitainer in an 8"x8"x8" cardboard box (FSN 8115-00-179-0568). Do not use glass containers.

b. Solids--

(1) Soil--Use one gallon plastic wide-mouth jars with metal lids and suitable shipping cartons for soil sampling. Suitable plastic jars may be ordered through your supply channels. They should be natural heavy duty polyethylene, hold approximately one gallon of sample, be of wide-mouth design and have steel or heavy duty plastic screw caps with seals. Most laboratory supply firms stock jars of this type.

(2) Other Industrial or Environmental Solids--Use the same type of jar as for soils, or alternately, the sample should be packed in double heavy-duty plastic bags, sealed to prevent spillage and packed securely in shipping boxes. For vegetation, we prefer soil jars.

(3) For Biological Solids--Please call us for specific instructions.

c. Necessary items should be ordered through normal supply channels.

(1) Bag, plastic, 13"x12"x24", 2 mil thick, FSN 8105-00-655-8285.

(2) AF Form 495--Local Publication Office (PDO).

(3) AF Form 2753--Local Publication Office (PDO).

(4) Paper, filter, 4.25 cm dia., Whatman Catalog # 1001M042, (1-800-Whatman)

(5) Bag, paper, glassine, 5 3/4"x7 3/4", FSN 8105-00-584-2660.

(6) Tube, biological culture, FSN 6640-00-729-6484.

(7) Box, shipping, 8"x8"x8", FSN 8115-00-179-0568.

(8) Bottle, screw cap, collapsible, square, one gallon capacity, 12/pkg, FSN 6640-00-117-7855.

(9) Bottle, screw cap, collapsible, square, one quart capacity, 12/pkg, FSN 6640-00-117-8042.

(10) 24 Hour Urine Container, 3.0 Liter, Cs (40) Curtin Matheson Scientific Catalog # 282-252

(11) Soil Jars, HPDE, One Gallon, Screw Cap, Cs, 8125-01-227-6038

3. SHIPPING

a. General instructions for packaging and shipping samples are contained in Appendix A, pages A-5 through A-7 . For most expeditious shipment of routine radiological samples, the U.S. Mail is recommended. Radon breath collections must be shipped by methods that insure overnight delivery. Priority samples must be shipped by a method that will provide delivery time consistent with priority needs. Samples delivered by routine channels will not normally be considered priority samples. The shipping address for ALL radiological samples is:

AL/OEBA
2402 E.Drive, Building 140
Brooks AFB TX 78235-5114

b. Shipping or mailing potentially radioactive materials requires extra care to ensure that we don't create a hazard to carriers. Additionally, AF and US Mail regulations and federal statutes must be followed carefully.

Appendix B
AF Form 495 INSTRUCTIONS
Swipe Sampling

INSTRUCTIONS FOR COMPLETING AF FORM 495, SWIPE CONTAINER

The purpose of this form is to record collection information on swipes submitted for radiological analysis and to provide a container for the swipe when it is shipped to the Armstrong Laboratory, Occupational and Environmental Health Directorate, Bioenvironmental Engineering Division, Radioanalytical Branch (AL/OEBA). Do not use AF Form 2753 for submission of routine swipe samples.

1. IDENTIFICATION DATA

a. Enter the name and complete mailing address of the submitting activity (where the analysis report is to be sent).

b. Enter the name and DSN number of the person performing the test.

c. Radionuclide or type of radiation. If this is unknown, specify the type of radiation (alpha, beta and/or gamma) or the equipment being swiped if applicable.

d. Base Sample Number (consisting of eight digits)--The first two digits classify the sample as to the collection method and sample type. The next two digits identify the calendar year the sample was taken. The last four digits identify the locally assigned number, progressing in numeric sequence from sample number 0001 to 9999. This sequence should be started over with each new calendar year. (See AFI 161-17, and/or Appendix A, page A-2 of this guide).

SWIPE CONTAINER

NAME AND ADDRESS OF SUBMITTING ACTIVITY			DATE SUBMITTED
			RADIAC READING
NAME AND TELEPHONE NUMBER OF PERSON PERFORMING TEST			AREA SWIPED (SQ(M))
RADIONUCLIDE OR TYPE OF RADIATION		SOURCE CODE	
BASE SAMPLE NUMBER	SERIAL NUMBER OF SOURCE		
DATE RECEIVED	BASE CODE	USAF OEHL NUMBER	
SEND TO:	AL/OEBA 2402 E DRIVE BROOKS AFB, TX 78235-5114		

AF Form 495, JUL 87 PREVIOUS EDITIONS WILL BE USED.

AF Form 495 (ILLUSTRATION ONLY) Not To Scale

EXAMPLE: WW 94 0014 is a wipe or swipe sample, and is the fourteenth sample of any kind that you have collected in 1994. (Helpful Hint: The prefix "WW" is used for all swipes.)

e. Date Submitted. Enter the date collected.

f. Radiac reading: Record your actual reading, specifying units (CPM, mR/HR, etc.). For beta/gamma use ANPDR-27, an ion chamber survey meter or other suitable beta/gamma instrument. For alpha use PAC-1S, AN/PDR-56F or other suitable alpha instrument. Please indicate which instrument was used.

g. Source Code. **Not Used**

h. Serial Number of Source. Enter the serial number of the source being swiped when applicable.

i. Mailing code (base code) for your particular facility, consisting of an alphabetical prefix, a number, and a suffix. If you are unsure of your correct mailing code, please call us at DSN 240-2061. Failure to provide the proper mailing code may cause your results to be misrouted or delayed in processing; in particular, the correct suffix is essential.

(1) The alphabetical prefix indicates your command. It is assigned by AL/OEBA, and is used for radiological samples **only** at this time.

(2) Numeric code (up to five digits) assigned to your base by AL/OEBA. This code should be referenced in all correspondence with the AL/OEBA.

(3) The alphabetical suffix indicates a particular mailing address on your base. It is assigned by AL/OEBA.

Use only the front side of AF Form 495. The reverse side of AF Form is for AL/OEBA use only.

Please note that the mailing address on the AF Form 495 illustration is the correct address for AL/OEBA. Please ensure that you use the correct address when submitting swipe samples.

Actual copies of AF Form 495 are available or can be ordered through your local Base PDO.

Appendix C
AF FORM 2753 INSTRUCTIONS
Environmental and Biological Radiological Sampling

AF Form 2753 Instructions...Appendix C

INSTRUCTIONS FOR COMPLETING AF FORM 2753, ENVIRONMENTAL AND BIOLOGICAL RADIOLOGICAL SAMPLING DATA

The purpose of this form is to record collection information for radiological samples. The form is to be used for samples submitted to Armstrong Laboratory, Occupational and Environmental Health Directorate, Bioenvironmental Engineering Division, Radioanalytical Branch (AL/OEBA). The front side (Part 1) of the 2753 is submitted for environmental samples while the reverse side (part 2) of the 2753 is used for biological samples. This form is now available on PerFORM PRO. Please see your local PDO. Do not use this form for submission of routine swipe samples; use AF Form 495, Swipe Container.

For environmental samples, the following describes the appropriate entries for the various fields on the AF Form 2753. If you are completing this form for biological samples, please use the guidance under part 2 of this section.

1. **PART 1 -- AF Form 2753, ENVIRONMENTAL RADIOLOGICAL SAMPLES**

a. **Workplace or Site Identifier** -- Enter code for Workplace Identifier (if industrial sample) or Site Identifier (if environmental sample). These codes are shown in **Attachment III-A3-3.**

b. **Base** -- Enter name of base where workplace is located.

c. **Organization** -- Enter name of organization.

d. **Workplace or Site** -- Enter name of workplace or site.

e. **Building Number/Location** -- Enter building number or location.

f. **Room/Area** -- Enter specific part of workplace being sampled (e.g., Room 26, specimen handling table). If sample pertains to entire workplace, enter "NA" (not applicable).

g. **DATE COLLECTION BEGAN** -- Enter date sample collected or date sampling began (e.g., if Jan 14, 1994, enter 94/01/14).

h. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling began.

i. **DATE COLLECTION ENDED** -- Enter date sample collected or date sampling ended (e.g., if Jan 14, 1994, enter 94/01/14).

j. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling ended.

k. **MAIL REPORTS TO** --

I. Your Office or Organization

a. Enter the mailing code (base code) for your particular facility, consisting of an alphabetical prefix, a number, and a suffix. If you are unsure of your correct mailing code, please call us at DSN 240-2061/2062 or commercial (210) 536-2061/2062. Failure to provide the proper mailing code may cause your report to be misrouted or delayed in processing.

b. The alphabetical prefix indicates your command. It is assigned by AL/OEBA and is used for radiological samples only at this time.

c. Numeric code (up to five digits) assigned to your base by AL/OEBA. This code should be referenced in all correspondence with the AL/OEBA.

d. The alphabetical suffix indicates a particular mailing address on your base. It is assigned by AL/OEBA.

ll. **Copies To:** You can enter up to two additional address codes for duplicate copies of the reports, and we will mail them directly to your intended recipients (your command BEE? The base Civil Engineer?) If you wish to do this, please call us prior to the first time, so that we can make sure your intended recipient is in our data base, and give you the correct address code to use.

l. **SAMPLE COLLECTED BY** -- Enter name (last name, first name, middle initial), grade, and AFSC of individual collecting sample.

m. **SIGNATURE** -- Enter signature of individual collecting the sample.

n. **DSN** -- Enter DSN number of responsible individual who can answer questions that may arise from the laboratory concerning the sample.

o. **REASON FOR SUBMISSION** -- Select and enter code (from the boxes to the right) indicating the reason for submission. If "other" is chosen, please specify the reason.

p. **Base Sample Number** -- Enter eight-digit coded base sample number (See Appendix A, page A-2).

q. **Analysis Requested** -- Specify the radionulides you need specific analysis for. If analysis by a specific mode is desired, please specify with a brief justification. For example, please analyze by alpha spectroscopy for ^{234}U, ^{235}U, ^{238}U to distinguish naturally occurring uranium from depleted uranium contaminant.

r. **Air Filter Data** -- Enter the volume of air collected on the air filter. Use cubic meters (M^3) if possible. If another unit of volume is used, please indicate the volumetric unit (i.e. cubic feet (ft^3)).

s. ***Read and Understand the certification statement!*** -- The individual responsible for directing the sample collection must sign and date the 2753. If other hazardous materials could be present, please indicate in the comments section the nature and extent of the material. Samples with hazardous materials will be sent back to originators for disposal after analysis is completed. *We will also return samples to originators for disposal if the certification statement is not signed.*

2. **PART 2 -- AF Form 2753, BIOLOGICAL RADIOLOGICAL SAMPLES**

a. **Workplace or Site Identifier** -- Enter code for Workplace Identifier (if industrial sample) or Site Identifier (if environmental sample). These codes are shown in Attachment III-A3-3.

b. **Base** -- Enter name of base where workplace is located.

c. **Organization** -- Enter name of organization.

d. **Workplace or Site** -- Enter name of workplace or site.

e. **Building Number/Location** -- Enter building number or location.

f. **Room/Area** -- Enter specific part of workplace where individual being sampled primarily works (e.g., Room 26, specimen handling table). If the individual works in or covers the entire workplace, enter "NA" (not applicable).

g. **DATE COLLECTION BEGAN** -- Enter date sample collected or date sampling began (e.g., if Jan 14, 1994, enter 94/01/14).

h. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling began.

i. **DATE COLLECTION ENDED** -- Enter date sample collected or date sampling ended (e.g., if Jan 14, 1994, enter 94/01/14).

j. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling ended.

k. **MAIL REPORTS TO** --

I. Your Office or Organization

a. Enter the mailing code (base code) for your particular facility, consisting of an alphabetical prefix, a number, and a suffix. If you are unsure of your correct mailing code, please call us at DSN 240-2061/2062 or commercial (210) 536-2061/2062. Failure to provide the proper mailing code may cause your report to be misrouted or delayed in processing.

b. The alphabetical prefix indicates your command. It is assigned by AL/OEBA and is used for radiological samples only at this time.

c. Numeric code (up to five digits) assigned to your base by AL/OEBA. This code should be referenced in all correspondence with the AL/OEBA.

d. The alphabetical suffix indicates a particular mailing address on your base. It is assigned by AL/OEBA.

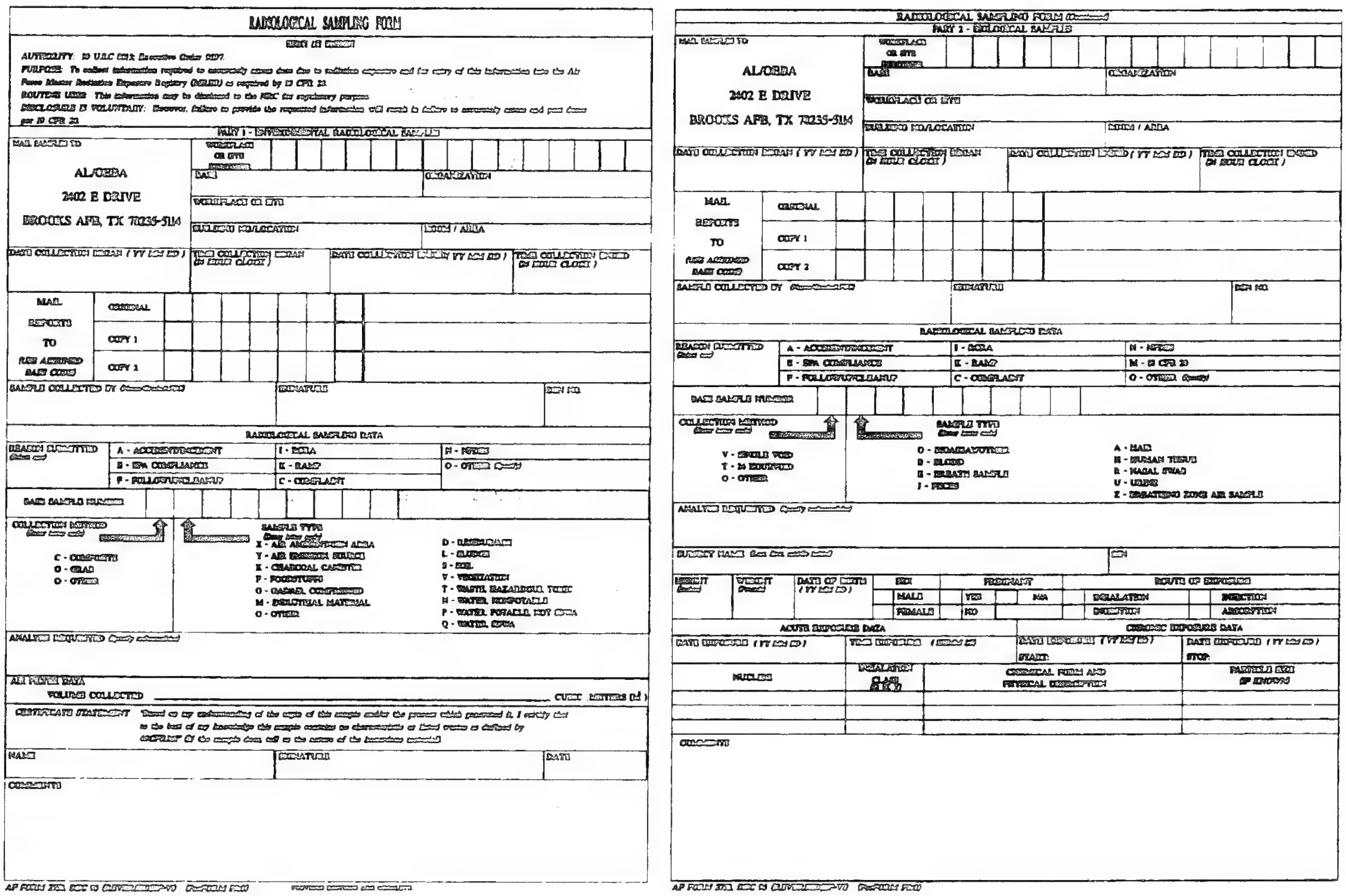
II. **Copies To:** You can enter up to two additional address codes for duplicate copies of the reports, and we will mail them directly to your intended recipients (your command BEE? The base Civil Engineer?) If you wish to do this, please call us before the first time, so that we can make sure your intended recipient is in our data base, and give you the correct address code to use.

l. **SAMPLE COLLECTED BY** -- Enter name (last name, first initial), grade, and AFSC of individual collecting sample.

m. SIGNATURE -- Enter signature of individual collecting the sample.

n. DSN -- Enter DSN number of responsible individual who can answer questions that may arise from the laboratory concerning the sample.

o. REASON FOR SUBMISSION -- Select and enter code (from the boxes to the right) indicating the reason for submission. If "other" is chosen, please specify the reason.



AF Form 2753 Radiological Sampling Form (ILLUSTRATION ONLY)

p. **Base Sample Number** -- Enter eight-digit coded base sample number (See Appendix A, page A-2).

q. **Analysis Requested** -- Specify the radionulides you need specific analysis for. If analysis by a specific mode is desired, please specify with a brief justification. For example, please analyze by alpha spectroscopy for ^{234}U, ^{235}U, ^{238}U to distinguish naturally occurring uranium from depleted uranium contaminant. *If this is the initial, baseline sample, please specify. You still need to specify radionuclides that this individual is potentially exposed to.*

r. **Subject Name** -- Enter name of individual being sampled, (Last, First, Middle Initial).

s. **Subject Social Security Number (SSN)** -- Enter SSN of individual being sampled.

t. **Height, Weight, Date of Birth, Sex, and Pregnancy Verification** -- Self Explanatory.

u. **Route of Exposure** -- Select the most likely route for the radionuclide to enter the body of the individual being sampled (Inhalation, Ingestion, Wound/Injection, or Absorbtion).

v. **Acute or Chronic Exposure Data** -- For acute exposures, enter the date and time (best estimate if not specifically known) of exposure. For chronic, relatively long duration exposures, enter the beginning date and ending date of the monitoring period.

w. **Nuclide** -- Specify the nuclides that the individual had potential exposure to.

x. **Inhalation Class and Chemical Form** -- Enter the inhalation class and chemical form appropriate for the operation being monitored. If unknown, contact OEBA for guidance. 10 CFR 20 Appendix B is useful also for determining the class and form. In short the Inhalation class is the lung clearance rate for the specific chemical form of the radionuclide. Class D refers to lung clearance rates of 0-10 days; Class W refers to lung clearance rates of 10-100 days, and Class Y refers to clearance rates greater than 100 days.

y. **Particle Size** -- Estimate the AMAD (Activity Median Aerodynamic Diameter) diameter. AL/OEBA will use a default AMAD of one micron (1 μm) if not specified or if the AMAD is unknown.

z. **Comments** -- Enter any comments appropriate to the sample.

3. Submit original AF Form 2753 with each sample being analyzed. The file copy is for local use a suspense or documentation. Ensure that you maintain a copy with your records and suspense files.

General Information

Priority Request

To insure priority sample requests are approved, received, processed and analyzed by the Analytical Services Division in an accurate and timely manner, please follow the below instructions.

1. Call Analytical Services at DSN 240-3626, COMM 210-536-3626 and ask for the appropriate Branch chief or the Division chief for approval.

2. The following information is required for a priority request:

   a. Base Name
   b. Requester's Name
   c. DSN and/or commercial phone number
   d. Type of sample for analysis
   e. Base sample number
   f. Test required

3. Annotate in red in the remarks section the word "PRIORITY".

4. Attach a letter requesting priority processing for the sample with the following justification items:

   a. Reason for the priority request
   b. AL/OEA person contacted
   c. Base point of contact for phone results

5. The samples and accompanying paperwork must be sent by priority mail, ie., Federal Express, Overnight Mail, etc. Since the laboratory is not normally in operation during the weekend or holidays, insure that delivery arrangements are made so that samples arrive on the next normal duty day.

Chain of Custody

1. For the purpose of possible litigation, it may be necessary to have an accurate written record which can be used to trace possession and handling of samples from the moment of collection until entry into the laboratory for analysis. It is important to keep the number of personnel involved with handling the samples to a minimum. Field records should be completed at the time the sample is collected and should be signed and dated. All records should be done in ink and written legibly. The collecting base must initiate the chain of custody record.

2. The following are the procedures for doing a chain of custody:

a. The samples should be placed in the transportation case with the sample analysis request and other required paperwork including the chain of custody record.

b. The base must notify sample control section at Armstrong Laboratory (DSN 240-3626) that samples are being sent under chain of custody.

c. The case should be sealed and labeled.

d. Every person who handles the samples must annotate the chain of custody record, before the transportation case is closed and after it is opened.

e. If the package is mailed, it can be registered with a return receipt requested.

Instructions for the Workplace Identifier Coding

1. All case files must be identified in a standardized manner. The standard identification, known as a Workplace Identifier (WI), assigns a sequence of letter and number codes to each workplace, uniquely characterizing it. The WI is, in essence, a workplace Social Security Account Number. It will be used on all data forms placed in case files and will eventually be the primary identifier for industrial hygiene data stored in a central Automated Data Processing (ADP) repository.

2. The WI consists of three sets of four digits each. The first set of digits designates the base where the workplace is located. The middle set of digits designates the type of organization (hospital, aircraft maintenance, civil engineering) and the work function (welding, painting, carpentry). The last set of digits designates the numerically sequenced case file number. Codes are as follows:

a. First set of four digits--the base code is derived from the change "film badge" to "personnel dosimetry" program base code found on the AL/OE Dosimetry Data Listing 1523 (formerly AF Form 1523, Dosimetry Data USAF Radiological Health Laboratory). These code numbers have been assigned by the AL/OE to all bases that have submitted radiological samples or badges for analysis. The code numbers currently have only three digits. However, future expansion capability to four digits is needed so that more than 999 installations can be accommodated. To use this number as a four-digit code, add a zero prefix to the three-digit base code. For example, Langley AFB base code number 101 becomes base code 0101 in the WI. There are some bases that do not have a code assigned. This occurs when either radiological samples or badges have never been submitted, or they have been submitted by an attending Bioenvironmental Engineer (BEE) using the code of the attendee's base. In these cases, contact AL/OEBA, AUTOVON 240-2061, for assignment of a code number. Do not use the code from the attendee's base.

b. Middle set of four digits--the codes for identifying organizations and work functions have been determined by AL/OE. To determine the appropriate code, locate the two-letter code for the type organization, then locate the two-letter code for the work function. A work function code can be used in combination with any organizational code, not just the organization under which it is listed. If a workplace can be described by more than one work function code, use the code that represents the function presenting the most hazardous work performed. Codes are not listed for every work function in the Air Force, just those where a sufficient number of similar functions exist to enable future, statistically significant, epidemiological studies. If an appropriate code cannot be found, enter XX to signify "other" organizations or work functions. As an example of coding organizations and work functions, consider an F-15 aircraft field maintenance squadron welding shop. Find the organizational code, FA, for fixed wing aircraft; and, work function code, WE, for welding shop on the attached list. The four-digit code would be FAWE.

c. Last set of four digits--the case file number codes are assigned at base level. These ensure a unique identification of every workplace because a given base could have more than one shop with the same organization and work function codes. The case file codes are assigned in numerical sequence by the base BEE starting with case file number 001 and progressing as high as 999. Since there are four digits in this code, a suffix can be added to further subdivide a workplace into smaller work centers or other specialized tasks, for example, specific machines, degreasing rooms. This further subdivision of the case file number code is a local base option. If not used, an A suffix is placed after the case file number. If used, a capital letter, from B to Z, is laced after the case file number. For example, a shop having a case file number of 23 would be coded as 023A. If four smaller workcenters were to be identified, they would be coded 023B, 023C, 023D, and 023E.

3. Completed Workplace Identifier: The complete WI for the workplace described in previous examples would be written and interpreted as follows:

```
______________________________Langley AFB
|
|     ______________________Fixed Wing Aircraft
|     |
|     |  ___________________Welding Shop
|     |  |
|     |  |     _____________Case File No. 23
|     |  |     |
|     |  |     |  __________No Specific Work Center
|     |  |     |  |
0101 - FAWE  - 023A
```

4. In some instances, case files are maintained for an entire building or facility rather than for individual workplaces. Since specific functions cannot be identified, the middle set of four digits will be coded XXXX. In other instances, a WI must be assigned (because a sample is being taken) but no case file is maintained. The last four digits of the WI must, therefore, be coded 000A.

5. Workplaces occasionally change significantly due to mission requirements or physical relocation. When this occurs, professional judgment must be used to determine whether affected workers have experienced a major change in their workplace environment. If this is the case, the WI and its associated case file should be closed and a new WI and case file established.

WORKPLACE IDENTIFIER ORGANIZATION AND WORK FUNCTION CODES

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Hospital (and other medical facilities)	HO	Administrative Areas	AA
		BEE Laboratory	BE
		Central Surgical Supply	CU
		Clinical Laboratory	CL
		Dental Laboratory	DL
		Dental Treatment Rooms	DT
		Dental X-Ray	DX
		Emergency Room	ER
		Incinerator	IN
		Medical Maintenance	MM
		Medical Supply	MS
		Medical X-Ray	MX
		Nuclear Medicine	NM
		Occupational Therapy	OT
		Orthopedic or Brace Shops	OB
		Radiotherapy	RY
		Surgery	SY
		Other	XX

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Support Group	BA	Administrative Areas	AA
		Aero Club	AE
		Auto Hobby	AH
		Base Exchange	BX
		Ceramica (Arts and Crafts)	CH
		Commissary	CO
		Firing Range (Indoor)	FI
		Firing Range (Outdoor)	FO
		Graphics	GR
		Incinerator	IN
		Photo Laboratory	PP
		Reproduction/Duplication	RE
		Sentry/Guard Dog	SD
		Shredder, Classified Waste	SH
		Swimming Pool	SP
		Wood Hobby	WH
		Other	XX
Fixed Wing Aircraft	FA	Administrative Areas	AA
		Abrasive Blasting	AB
		AGE, Nonpowered	AN
		AGE, Powered	AG
		Aircraft Missle Maint.	AM
		Avionics	AV
		Battery	BA
		Carpentry/Woodworking	CA
		Corrosion Control	CC
		Docks, Aircraft	DO
		Egress	EG
		Electrical	EL
		Environmental Systems	EV
		Fabric, Parachute and Survival Equipment	FP
		Flightline Areas	FL
		Fuel Systems	FS
		Hydrazine Servicing	HY
		Jet Engine Maintenance	JM
		Jet Engine Testing	JT
		Life Support	LS
		Machine	MA
		Munitions Maint. and Storage	MU
		Nondestructive Inspection	ND
		Parts Cleaning (Chemical)	PR
		Phase Maintenance	PH
		Photo Processing	PP
		Plating	PG
		Pneudralics	PN

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Fixed Wing Aircraft	FA	TMDE (Calibration)	PM
		Reciprocating Engine Maint.	RM
		Reciprocating Engine Testing	RT
		Reclamation and Repair	RC
		Small Gas Turbine Engine Maintenance	TM
		Small Gas Turbine Engine Testing	TT
		Structural Repair	SR
		Tire and Wheel	TI
		Transient Maintenance	TR
		Trim Pads	TP
		Washracks	WR
		Weapons Release and Armament Shops	WA
		Welding	WE
		Other	XX
Rotating Wing Aircraft	RA	SAME AS FIXED WING AIRCRAFT	
Transportation	TR	Administrative Areas	AA
		Allied Trades	AT
		Battery	BA
		Packing and Crating	PC
		Corrosion Control	CC
		Refueling Maintenance	RF
		Vehicle Maintenance	VM
		Washrack	WR
		Welding	WE
		Other	XX
Supply	SU	Cryogenics	CR
		Fuels Laboratory	FU
		Hazardous Materials Storage (non radioactive)	HS
		POL Storage and Hydrants	PS
		Radioactive Material Storage	RS
		Other	XX
DRMO	DP	Hazardous Materials Storage (non radioactive)	HS
		Radioactive Material Storage	RS
		Other	XX

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Civil Engineering	CE	Administrative Areas	AA
		Burial Site (include suspected toxic substances dumps)	BS
		Carpentry	CA
		Electrical (Interior)	EL
		Electrical (Exterior)	EX
		Entomology	EN
		Explosive Ordinance Disposal (EOD)	EO
		Fire Department	FD
		Fire Extinguisher Maintenance	FX
		Golf Course Maintenance	GC
		Heavy Equipment Maint.	VM
		Housing Maintenance	HM
		Industrial Waste Treatment Plant (include oil separators)	IW
		Liquid Fuels Maint.	LF
		Masonry	MY
		Paint	CC
		Pavements and Grounds	PX
		Plumbing	PL
		Power Production	PW
		Radioactive Materials Burial Site	RB
		Refrigeration and Heating (Include Boiler Plants)	RH
		Sanitation/Landfill	SL
		Sewage Treatment Plant	ST
		Sheet Metal	SR
		Water Treatment Plant	WT
		Welding	WE
		Other	XX
Communications (except tactical, deployable squadrons)	CO	Administrative Areas	AA
		Cable Maintenance	CM
		FAA (tenant organizations)	FA
		Power Production	PW
		Radar (include Nav Aids, GCA)	RR
		Radio	RO
		Telephone, Teletype and Crypto	TE
		Weather Maintenance	WM
		Other	XX

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Tactical Air Control System (include Radar, Comm, Vehicle Transportation, DASC, CCT, and other units)	TA	Administrative Areas	AA
		AGE	AG
		Battery	BA
		Corrosion Control	CC
		Radar	RR
		Radio	RO
		Refrigeration and Heating	RH
		Vehicle Maintenance	VM
		Other	XX
Research, Development Test and Evaluation	RD	Administrative Areas	AA
		Laboratories	LA
		Test/Bombing Ranges	RG
		Other	XX
Missile, Ground Launched (include Titan, Minuteman, MX, and other ICBM/Space Systems)	MI	Administrative Areas	AA
		Battery	BA
		B Plug Refurbishing	BP
		Corrosion Control	CC
		Electro/Mechanical	EM
		Environmental Servicing	ES
		Electronics	ME
		Facility Electric	FE
		Mechanical	MC
		Missile Site	MI
		Periodic Maintenance Team	PE
		Pneudraulics	PN
		Power Production	PW
		Propulsion/Missile Handling	MH
		Re-entry Vehicle	RV
		Refrigeration	RH
		Servicing (PTS)	RT
		Team Supervision	TS
		Vehicle Care/Payloader	VP
		Other	XX
Depot Maintenance Activities. The following organizational codes apply to Air Logistics Centers only:		The following work function codes can be used with any of the ALC organizational codes. Fixed wing aircraft and missile work function can also be used.	
Depot Aircraft Maintenance (general)	DA	Abrasive Blasting	AB
		Accessories Testing	AC
		Aircraft Brakes Maintenance	BM

ORGANIZATION TYPE	CODE
Depot Engine Maintenance	DE
Depot Accessories Maintenance	DS
Depot Facility Maintenance (Plant Management	DF
Depot Miscellaneous/ Material Management	DM
Depot Distribution	DD
Depot Missile Maintenance (general)	DI
Depot Missile Maintenance	DI

WORK FUNCTION TYPE	CODE
Aircraft Landing Gear Maint.	LM
Assembly/Disassembly	AD
Bearing Shop	BG
Cabin Pressure Systems	CP
Carburetor Repair	CT
Chemical Laboratories	CB
Chemical Mixing	CX
Composite Fiber Shop	CI
Computer Rooms	CS
Cryogenics Spin Facility	CF
Drop Hammer Operations	DH
Foundry	FR
Fuel Accessory Repair and Test	FT
Fuel Cell Repair	FS
Governor/Fuel Control Systems	GF
Gyro Shop	GY
Heat Treatment	HT
Honeycomb Repair (Metal Bonding)	HR
Hydrazine Servicing	HY
Material Processing	MP
Metalizing Shop	MT
Metallurgical Laboratories	ML
Metal Treating	MT
Missile Motor Testing	MR
Missile Propellant Test	MO
Mixing Room Epoxy and Paint	MG
Nondestructive Inspection	ND
Operations Centers	OC
Oxygen Systems	OX
Parts Cleaning (Chemical)	PR
Parts Cleaning (Mechanical)	PA
Plant Equipment Maintenance	EP
Plant Mechanical Systems	MY
Plant Services	SV
Potting/Depotting	PD
Production Centers	PO
Propeller Shop	PY
Reliability Laboratory	RL
Sermetal Operations	SM
Shot Peening	SO
Solvent Dispensing Stations	SS

ORGANIZATION TYPE	CODE	WORK FUNCTION TYPE	CODE
Depot Missle Maintenance	DI	Special Engineering	SE
		Strut Repair	SA
		Tank and Radiator Repair	TA
		Transmission Systems	TN
Other Organizations not listed above	XX	Use any of the work functions listed above	XX

Assignment of Base Sample Numbers

1. Samples that are collected at base level must be assigned a sample number, regardless of whether they are analyzed locally or at another laboratory. This coded sample number will enable the analytical results to be ultimately stored and retrieved from an automated central data repository. A sample number code consists of eight digits. The first two digits classify the sample collection method and location (or type). The next two digits are used to identify the calendar year that the sample was taken and the last four digits are the locally assigned sample number, progressing in numerical sequence from sample number 0001 through sample number 9999. Sample number codes are as follows.

a. First two digits

(1) Digit #1 - Collection Method
F = Full Period Consecutive Air Samples
E = Full Period Single Air Sample
P = Partial Period Consecutive Air Samples
S = Single Batch Process Air Sample
G = Grab Sample (including bulk samples)
W = Wipe or Swipe Sample
O = Other Type of Sample
B = Blank Sample (used for analytical control)

(2) Digit #2 - Sample type

S = Soil
L = Sludge
N = Nonpotable water
P = Potable water
X = Air, Ambient or General Area Sample
Z = Air, Breathing Zone (not compressed air)
Y = Air, Source of Contamination or Contaminant Emission
F = Food Products
G = Gas, Compressed or Liquified
M = Industrial Material (commercial product)
K = Blank of Collection Media
D = Residue or Ash
W = Surface Contamination (as for a wipe sample)
T = Toxic or Hazardous Waste
C = Unclassified

b. Next two digits - Code for the sample year using the last two numbers of the calendar year in which the sample was taken. Example: The code for the calendar year 1981 is 81.

c. Last four digits - Code for the locally assigned, numerically sequenced sample number. Example: The code for the thirteenth sample taken during the calendar year is 0013.

2. Completed Base Sample Number. To exemplify a completed code, consider a series of industrial hygiene air samples taken to establish a time weighted average concentration. The sampling device was located close to a worker's breathing zone. Nine samples were taken on that worker during an entire eight-hour workday. Eighty-six other samples had already been taken at the base that year (1981). The first of these nine samples would be assigned a base sample number as follows:

Full Period Consecutive Sample

Breathing Zone

Calendar Year 1981

Sample No. 87

F Z 81 0087

a. The remaining eight samples would be coded "FZ810088," "FZ810089"....."FZ810095."

b. The blank sample of the collecting media (filter, charcoal tube or solution) would be coded "BK810096."

c. Bulk (industrial materials) are coded in a similar manner except that the first two digits will be "GM", for example, "GM810097."

Note: A Compliance Sample is defined as the minimum amount of the total time of the shift less one hour. (i.e. If the shift lasts a total of 8 hours, you have to sample for a minimum of 7 hours in order to be a compliance sample.)

Industrial Hygiene/Occupational Health

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Industrial Hygiene/Occupational Health

General Guidelines for Temperature & Pressure Correction

1. OSHA PELs and ACGIH TLVs are reported in mg/m^3 and ppm at Standard Temperature and Pressure (STP). Since the sample results provided by AL/OEA are normally in mg/m^3 and as all OSHA PELs and ACGIH TLVs are also reported in mg/m^3, we recommend you always use mg/m^3 to compare your results to the standards (thus avoiding confusion with STP correction when comparing the sample results to standards in ppm). For direct reading instrument reporting in ppm, results should be adjusted to STP before comparison to the standard.

   a. To convert mg/m^3 to ppm at STP, use the following equation.

$$ppm_{at}STP=\frac{mg}{m3}x\frac{24.45}{MW}$$

where: MW = Molecular Weight

mg/m^3 = Reported concentration in mg/m^3

2 Calibrate the sampling pump at the sampling conditions (i.e., same temperature and pressure) whenever possible.

a. If the calibration and sampling conditions are different, and the pump you are using is a volumetric flow pump (such as DuPont Alpha 1, P-200, P-400), don't correct for temperature and pressure. In this case, the sample results you received from AL/OEA in mg/m^3 can be compared with the PELs or TLVs in mg/m^3. (However, you must know that these pumps undergo some change [normally 5%] in flow rates due to change in temperature and pressure and there is no acceptable method to correct them)

b. If the calibration and sampling conditions are different, and the pump you are using is a variable area flow pump (such as pump with rotameter), correct your sample volume according to the following equation. (Remember, AL/OEA will report your sample results based on the sample volume you report on the sampling form. So, if you report corrected volume in this form, you don't have to correct the sample results; otherwise your sample results have to be corrected to sample volume.)

$$QA=QI\sqrt{\frac{Pc}{Pa}x\frac{Ta}{Tc}}$$

where: QA = Flow rate - actual
QI = Flow rate - indicated
P = Pressure (units in mmHg, Atmosperes, Torr)(Pc - at calibration site; Pa - at actual site)
T = Temperature (Degrees C^0 + 273^0K) (Tc - at calibration site; Ta - at actual site)

Explanation of Table Headings

Analyte: The name of the chemical as it appears in the ACGIH booklet of Threshold Limit Values for Chemical Substances and Physical Agents. Synonyms are not listed in this table. Use other references to look up synonyms.

CAS Number: A number code that uniquely corresponds to the specific analyte or class name of an analyte. CAS numbers consist of up to 5 digits, a hyphen, 2 digits, a hyphen followed by a single digit. The hyphens have been omitted in the following table.

OEL: This is the Occupational Exposure Limit. Listed are the most current exposure limits. The first letter indicates the source of the OEL (A - ACGIH, O - OSHA). The letter at the end indicates the type of limit (C - Ceiling, S - STEL). If there is no letter at the end, this means that the limit is an 8 hour time weighted average.

Collection Method: This is a combination of two separate codes. The first set of characters (Alphanumerics) is the collection device (i.e., charcoal tube, midget impingers, etc.). The second three characters (numerics) identify how the sample is handled and routed in the laboratory (i.e., analytical technique such as instrumentation and desorbtion solution). If two analytes are requested on a sample, then the collection and analytical methods must be identical for both analytes, otherwise separate samples must be submitted. The superscript above the impinger methods indicate the sampling fluid. The asterisk (*), refers to the end of the table for the impinger/bubbler fluid list.

Analysis Method: Identifies the principle analytical methodology used for analysis. The letter before the numbers indicate the source of the analytical method (ID and O - OSHA; N, NPCAM and NS - NIOSH).

Rate: Liters per minute (Lpm), the range of sampling rates which can be used in collection of the sample. It is recommended that the maximum rate be used whenever possible. After selection of the sampling rate, determine the sampling time by dividing the recommended volume by the sampling rate.

Vol: Recommended volume in liters (L), the range of volume of air required for reliable analysis for a sample concentration that ranges between slightly less than 0.1 of the TLV and greater than 2 times the TLV for the majority of the analytes. If the concentration is expected to be high, collect a volume that is at or near the lower value given. If the concentration is expected to be low, collect a volume that is near the upper value. Volumes greater than the upper value should not be collected since there is a probability that breakthrough or overloading will occur.

LOD: Limit of Detection for the analysis method. This value is the detection limit for a specific method and is limited by the sample volume collected.

SAE: Sampling and Analytical Error or precision of the analytical procedure. The precision will be measured as the coefficient of variation (relative standard deviation). It was determined from replicate injections of analytical standards.

Hold: The holding time. The first number indicates the temperature (degrees centigrade), the samples should be kept at after sampling. The second number indicates the maximum number of days the samples have until they need to be analyzed. <u>Samples should be sent in immediately after sampling, chances of losing some or all of the sample greatly increases with time</u>. * Indicates sample is light sensitive.

I H Sampling Collection Table

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ACETALDEHYDE	75070	A-45C	XC-115	N2538	0.01-0.05	1-12	2	0.12	4/21
ACETALDEHYDE	75070	A-45C	XC-115	O68	0.05	3	1050	0.061	4/21
ACETIC ACID	64197	A-25,37S	MB[1]-XXX Note	ID-118	1	120	0.5	0.126	
ACETIC ANHYDRIDE	108247	A-21 O-20C	MB[2]-430	N3506	0.2-1.0	25-100	50	0.06	25/4
ACETONE	67641	A-1780,2380S N-590	CT-101	N1300	0.01-0.2	0.5-3	20	0.082	25/28
ACETONE	67641	A-1780,2380S N-590	CS-174	O69	0.05	3	4700	0.082	25/28
ACETONITRILE	75058	A-67,101S N-34	C1-109	N1606	0.01-0.2	3-25	10	0.072	25/28
ACETOPHENONE	98862	A-49		NONE					
ACETYLENE TETRABROMIDE	79276	A-14	SG-111	N2003	0.2-1.0	50-100	0.08	0.096	25/28
ACROLEIN	107028	A-0.23,0.69S	XB-215	N2501	0.01-0.1	1.5-48	2	0.111	25/28
ACROLEIN	107028	A-0.23,0.69S	XB-215	O52	0.1	48	6.1	0.071	25/28

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ACRYLAMIDE	79061	A-0.03	GGSG-219	O21	1.0	120	3.8	0.071	25/15
ACRYLIC ACID	79107	A-5.9		NONE					
ACRYLONITRILE 29CFR1910.1045	07131	A-4.3 O-10C	CT-160	N1604	0.01-0.2	3.5-20	1	0.06	25/7
ADIPIC ACID	124049	A-5		NONE					
ALDICARB	116063			NONE					
ALDRIN	309002	A-0.25	$GFMB^3$-200	N5502	0.2-1.0	18-240	3	0.092	25/28
ALLYL ALCOHOL	107186	A-4.8,9.5S	CT-103	N1402	0.01-0.2	1-10	10	0.111	-4/7
ALLYL CHLORIDE	107051	A-3,6S	CT-109	N1000	0.01-1.0	15-100	10	0.071	25/28
ALLYL GLYCIDYL ETHER (AGE)	106923	O-22,44S	TN-117	NS346	≤0.2	≤8	19	0.057	25/28
ALLYL PROPYL DISULFIDE	2179591	A-12, 18S		NONE					
ALUMINUM (fumes)	7429905	A-5	MF-367	N7300	1-4	5-100	1	0.023	25/28
ALUMINUM OXIDE as Al	1344281	A-10 Total O-5 Resp	MF-367	N7013	1-3	10-400	2	0.03	25/28
ALUMINUM OXIDE	1344281	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ALUMINUM OXIDE	1344281	O-5 Resp	DOP7-500	N0600	1.7	75-1000	200	.043-.145	25/28
4-AMINODIPHENYL 29CFR1910.1011	92671	A1	GGSG-106	N269	0.2	50			
2-AMINOPYRIDINE	504290	A-1.9	T5-135	NS158	0.01-0.2	12	2	0.061	25-28
AMITROLE	61825	A-0.2		NONE					
AMMONIA	7664417	A-17,24S	PA-6XX Note	N6701	2.5-8 hrs	N/A	1.0	0.085	25/28
AMMONIUM CHLORIDE FUME	12125029	A-10,20S		NONE					
AMMONIUM PERFLUOROOCTANOATE	3825261	A-0.1		NONE					
AMMONIUM SULFAMATE	7773060	A-10 Total O-5 Resp		NONE					
n-AMYL ACETATE	628637	O-525	CT-101	N1450	0.01-0.2	1-10	20	0.051	25/28
sec-AMYL ACETATE	626380	O-650	CT-101	N1450	0.01-0.2	1-10	20	0.071	25/28
ANILINE and homologues	62533	A-7.6	SG-112	N2002	0.02-0.2	5-30	10	0.060	25/28
ANISIDINE	29191524	A-0.5		NONE					
ANTIMONY and compounds	7440360	A-0.5	MF-XXX Note	NPCAM 189	1.5-2	100	0.015	0.10	25/28

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ANTU	86884	A-0.3		NONE					
ARSENIC 29CFR1910.1018	7440382	O-0.01 Inorg O-0.5 Org N-0.002C	MF-3XX Note	N7900	1-3	30-1000	0.02	0.11	4/28
ARSINE	7784421	A-0.16 N-0.002C	CT-3XX Note	N6001	0.01-0.2	1-10	0.004	0.087	25/6
ASBESTOS Amosite Chrysotile Crocidolite other forms	 12172735 12001295 12001284			*See Notes					
ASPHALT FUMES	8052424	A-5 N-5C		NONE					
ATRAZINE	1912249	5.0		NONE					
AZINPHOS-METHYL	86500	0.2		NONE					
BARIUM, soluble cmpds	7440393	0.5	MF-361	N7056	1.0-4.0	50-2000	2	0.054	25/28
BARIUM SULFATE	7727437	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
BARIUM SULFATE	7727437	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
BENOMYL	17804352	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
BENOMYL	17804352	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
BENZ [a] ANTHRACENE	56553	A2	TGX4-XXX Note	N5506	2	200-1000	0.015	0.032	-4/28
BENZENE 29CFR1910.1028	71432	O-3,15S N-0.32,3.2C	CT-101	N1501	≤0.2	2-30	1-10	0.059	25/28
BENZENE 29CFR1910.1028	71432	O-3,15S N-0.32,3.2C	CT-101	N1500	≤0.2	2-30	1-10	0.059	25/28
BENZIDINE 29CFR1910.1028	92875	A1	GGS3-7XX Note	N5509	0.2	20-100	0.05	0.07	-15/11
BENZO [b] FLUORANTHENE	205992	A2	TGX3-7XX Note	N5506	2.0	200-1000	0.1	0.027	0/28
BENZOYL PEROXIDE	94360	A-5	MF-717	N5009	1.0-3.0	40-400	0.01	0.06	25/7
BENZO [a] PYRENE	50328	O-0.2 N-0.1	TGX3-7XX Note	N5506	2.0	200-1000	0.1	0.027	0/28
BENZYL CHLORIDE	100447	O-5 N-5C	CT-101	N1003	0.01-0.2	6-50	10	0.096	25/7
BERYLLIUM and compounds	7440417	A-0.002 O-0.005C	MF-367	N7102	1.0-4.0	25-1000	0.005	0.064	25/28
BERYLLIUM and compounds	7440417	A-0.002 O-0.005C	MF-XXX Note	N7300	1.0-4.0	1250-2000	1.0	0.04	25/28
BIPHENYL	92524	O-1	T1-123	N2530	0.01-0.5	3-30	0.09	0.068	25/7

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* - Temperature in degrees centigrade.
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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
BISMUTH TELLURIDE	1304821	A-5se-doped A-10undoped O-5undoped Resp		NONE					
BORATES, tetra, sodium salts	1303964	1		NONE					
BORON OXIDE	1303862	A-10 Total	P7-500	N0500	1.5-2.0	25-133	200	0.056	25/28
BORON OXIDE	1303862	O-5 Resp	DOP7-500	N0600	1.7	25-133	200	0.056	25/28
BORON TRIBROMIDE	10294334	A-10C		NONE					
BORON TRIFLUORIDE	7637072	A-2.8C		NONE					
BROMACIL	314409	O-10		NONE					
BROMINE	7726956	A-0.66,1.3S	SM-6XX Note	N6011	0.3-1.0	8-360	1.6	0.69	25/30
BROMINE PENTAFLUORIDE	7789302	O-0.7		NONE					
BROMOFORM	75252	O-5	CT-101	N1003	0.01-0.2	4-70	10	0.071	25/7
1,3-BUTADIENE	106990	A-4.4	C4C3-110	N1024	0.01-0.5	3-25	0.2	0.06	4/60
BUTANE	106978	A-1900		NONE					
2-BUTOXYETHANOL	111762	N-24	CT-105	N1403	0.01-0.05	1-10	10-20	0.060	-4/7

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
2-BUTOXYETHANOL	111762	N-24	CT-105	O83	0.1	48	150	0.052	-4/7
n-BUTYL ACETATE	123864	O-710,950S	CT-101	N1450	0.01-0.2	1-10	20	0.069	25/28
sec-BUTYL ACETATE	105464	A-950	CT-101	N1450	0.01-0.2	1-10	20	0.054	25/28
tert-BUTYL ACETATE	540885	A-950	CT-101	N1450	0.01-0.2	1-10	20	0.091	25/28
n-BUTYL ACRYLATE	141322	A-52		NONE					
n-BUTYL ALCOHOL	71363	O-150C	CT-107	N1401	0.01-0.2	1-10	10	0.075	-4/28
sec-BUTYL ALCOHOL	78922	A-303 N-455S	CT-107	N1401	0.01-0.2	1-10	10	0.075	-4/28
tert-BUTYL ALCOHOL	75650	A-303 O-450S	CT-104	N1400	0.01-0.2	0.5-10	10	0.075	-4/7
n-BUTYLAMINE	109739	A-15C	S6-119	NS138	1.0	15	12	0.092	25/28
tert-BUTYL CHROMATE	1189851	A-0.1C N-0.001		NONE					
n-BUTYL GLYCIDYL ETHER	2426086	A-133 N-30C	CT-101	NS81	0.01-0.2	$\leq$10	10	0.074	25/28
n-BUTYL LACTATE	138227	O-25		NONE					
BUTYL MERCAPTAN	109795	O-1.5 N-1.8C	CD-114	N2525	0.01-0.05	1-4	3	0.062	25/7

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
o-sec-BUTYLPHENOL	89725	O-30		NONE					
p-tert-BUTYLTOLUENE	98511	A-6.1 O-120S	CT-101	N1501	$\leq$0.2	10-29	1-10	0.071	25/28
CADMIUM and Cd compounds 29CFR1910.1027	7440439	A-0.1 Total A-0.002 Resp	MF-XXX Note	N7048	1-3	25-1500	0.05	0.06	25/28
CALCIUM CARBONATE	1317653	A-10 Total	P7-500	N0500	1.5-2.0	25-133	200	0.056	25/28
CALCIUM CARBONATE	1317653	O-5 Resp	DOP7-500	N0600	1.7	75-1000	200	0.145	25/28
CALCIUM CHROMATE, as Cr	13765190	A-0.001		See Notes					
CALCIUM CYANAMIDE	156627	A-0.5		NONE					
CALCIUM HYDROXIDE	1305620	A-5		NONE					
CALCIUM OXIDE	1305788	A-2	MF-367	N7300	1.0-4.0	5-200	1.0	0.036	25/28
CALCIUM SILICATE	1344952	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
CALCIUM SILICATE	1344952	O-5 Resp	DOP7-500	N0600	1.7	75-1000	200	.043- .145	25/28
CALCIUM SULFATE	7778189	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
CALCIUM SULFATE	7778189	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
CAMPHOR	76222	O-2	CT-102	N1301	0.01-0.2	1-25	50	0.074	25/28

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
CAPROLACTAM (DUST)	105602	A-1, 3S		NONE					
CAPROLACTAM (VAPOR)	105602	O-20,40S N-1,3S		NONE					
CAPTAFOL	2425061	A-0.1		NONE					
CAPTAN	133062	A-5		NONE					
CARBARYL	632522	A-5		NONE					
CARBOFURAN	1563662	A-0.1		NONE					
CARBON BLACK	1333864	A-3.5	P5-5XXX Note	N5000	1.5-2.0	85-570	200	0.056	25/28
CARBON DIOXIDE	124389	A-9000, 54000S	GB-800	NS249	0.05	5	1 ppm	0.014	25/28
CARBON DISULFIDE	75150	N-3,30S O-12,36S	DRCT-115	N1600	0.01-0.2	2-25	20	0.059	25/7
CARBON MONOXIDE	630080	A-29 O-229C	GB-800	NS340	0.05	5	0.4 ppm	0.015	25/28
CARBON TETRACHLORIDE	56235	O-12.6 N-12.6S	CT-101	N1003	0.01-0.2	3-150	10	0.092	25/7
CARBONYL FLUORIDE	353504	A-13S O-5		NONE					
CATECHOL	120809	O-20		NONE				0.25	

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
CELLULOSE (Total Dust)	9004346	A-10 Total	P7-500	N0500	1.5-2.0	25-133	200	0.056	25/28
CELLULOSE (Resp Dust)	9004346	O-5 Resp	DOP7-500	N0600	1.7	75-100	200	0.056	25/28
CESIUM HYDROXIDE	21351791	A-2		NONE					
CHLORDANE	57749	A-0.5	MFCB-215	N5510	0.5-1.0	10-200	0.1	0.07	25/7
CHLORINATED CAMPHENE	8001352	A-0.5,1S	MF-225	N67	1.0	15	0.14	0.076	25/28
CHLORINATED DIPHENYL OXIDE	55720995	A-0.5	MF-226	N5025	0.5-1.5	8-200	2	0.07	25/28
CHLORINE	7782505	A-1.5,2.9S N-1.45C	SM-6XX Note	N6011	0.3-1.0	2-90	0.6	0.075	25/28
CHLORINE DIOXIDE	10049044	A-0.28, 0.83S		NONE					
CHLORINE TRIFLUORIDE	7790912	A-0.38C		NONE					
CHLOROACETALDEHYDE	107200	O-3C	S5-2XX Note	NS11	0.05-0.2	3	0.1	0.06	25/28
CHLOROACETONE	78955	O-3.8C		NONE					
∝CHLOROACETOPHENONE	532274	O-0.3		NONE					
CHLOROACETYL CHLORIDE	79049	O-0.2 A-0.69S		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
CHLOROBENZENE	108907	A-46	CT-101	N1003	0.01-0.2	1.5-40	10	0.056	25/7
o-CHLOROBENZYLIDENE MALONONITRILE	2698411	A-0.39C		NONE					
CHLOROBROMOMETHANE	74975	O-1050	CT-101	N1003	0.01-0.2	0.5-8	10	0.061	
CHLORODIFLUOROMETHANE	75456	O-3500 N-4375S		NONE					
CHLORODIPHENYL (42%)	53469219	N-0.001		NONE					
CHLORODIPHENYL (54%)	11097691	N-0.001		NONE					
CHLOROFORM	67663	O-9.78,240C N-9.78S	CT-101	O5	0.2	10	0.0053	0.085	25/7
CHLOROFORM	67663	O-9.78,240C N-9.78S	CT-101	N1003	0.01-0.2	1-50	10	0.057	25/7
bis (CHLOROMETHYL) ETHER 29CFR1910.1008	542881	A-0.0047		NONE					
1-CHLORO-1-NITROPROPANE	600259	A-10		NONE					
CHLOROPENTAFLUORO-ETHANE	76153	A-6320		NONE					
CHLOROPICRIN	76062	A-0.67		NONE					
β-CHLOROPRENE	126998	O-35 N-3.6C	CT-101	N1002	0.01-0.05	1.5-8	30	0.071	25/8

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
2-CHLOROPROPIONIC ACID	598787	A-0.44		NONE					
o-CHLOROSTYRENE	2039874	A-283, 425S		NONE					
o-CHLOROTOLUENE	95498	O-250 N-375S		N1003					25/7
CHLORPYRIFOS	2921882	A-0.2 N-0.6S		NONE					
CHLORPYRIFOS	2921882	A-0.2 N-0.6S	GGX5-215	O62	1.0	480	3.3	0.053	25/17
CHROMIUM	7440473	A-0.5	MF-351	N7024	1.0-3.0	10-1000	0.06	0.085	25/28
CHROMIUM	7440473	A-0.5	MF-3XX Note	N7300	1.0-4.0	5-1000	1.0	0.053	25/28
CHROMIUM (VI) cmpd.	744047H	A-0.05 O-0.1C	P5-463	N7600	1.0-4.0	8-400	0.05	0.084	25/14
CHROMYL CHLORIDE	14977618	A-0.16		NONE					
CHRYSENE	218019	O-0.2 N-0.1	TGX3-7XX Note	N5506	2.0	200-1000	0.1	0.039	0/28
CLOPIDOL	2971906	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
CLOPIDOL	2971906	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
COAL DUST	68131748	A-2		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
COAL TAR PITCH VOLATILES	65996932	A-0.2 N-0.1	TG-509	N5023	1.0-4.0	500-2400	50	0.02	25/28
COAL TAR PITCH VOLATILES	65996932	A-0.2 N-0.1	GF-509	O58	2.0	960	34	0.083	25/28
COBALT and cmpds	7440484	A-0.02	MF-353	N7300	1.0-4.0	25-2000	1.0	0.04	25/28
COBALT and cmpds	7440484	A-0.02	MF-3XX Note	N7027	1.0-3.0	30-1500	0.6	0.071	25/28
COBALT CARBONYL	10210681	A-0.1		NONE					
COBALT HYDROCARBONYL	16842038	A-0.1		NONE					
COPPER	7440508	O-Fume 0.1 Dust 1.0	MF-365	N7029	1.0-3.0	50-1500	0.05	.044F .051D	25/28
COPPER	7440508	O-Fume 0.1 Dust 1.0	MF-3XX Note	N7300	1.0-4.0	5-1000	1.0	0.036	25/28
COTTON DUST	NUPART	A-0.2		NONE					
CRESOL	1319773	N-10	SG-114	N2001	0.01-0.2	5-20	100	0.068	25/7
CRESOL	1319773	N-10	XG-719	O32	0.1	24	46	0.054	25/28
CROTONALDEHYDE	4170303	A-5.7	MB^8-XXX Note	NPCAM285	0.1-0.2	12	unk	0.061	
CRUFOMATE	299865	A-5 N-20S		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
CUMENE	98828	O-245	CT-101	N1501	$\leq$0.2	10-30	1-10	0.059	25/28
CYANAMIDE	420042	A-2		NONE					
CYANIDES	151508	A-5 N-5C	MFMB[9]-649	N7904	0.5-1.0	10-180	2.5	0.081	25/7
CYANOGEN	460195	O-20		NONE					
CYANOGEN CHLORIDE	506774	O-0.06C		NONE					
CYCLOHEXANE	110827	A-1030	CT-101	N1500	$\leq$0.2	2.5-5	0.01	0.06	25/14
CYCLOHEXANOL	108930	O-200	CT-103	N1402	0.01-0.2	1-10	10	0.08	-4/7
CYCLOHEXANONE	108941	A-100	CT-101	N1300	0.01-0.2	1-10	20	0.062	4/28
CYCLOHEXENE	110838	A-1010	CT-101	N1500	$\leq$0.2	5-7	0.1	0.073	25/14
CYCLOHEXYLAMINE	108918	O-40		NONE					
CYCLONITE	121824	A-1.5		NONE					
CYCLOPENTADIENE	542927	O-200	CD-XXX Note	N2523	0.01-0.05	1-5	10	0.066	25/7
CYCLOPENTANE	287923	A-1720		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
CYHEXATIN	13121705	A-5		NONE					
2,4-D	94757	A-10	GF-719	N5001	1.0-3.0	15-200	15	0.051	25/7
DANSANIT	115902	0.1		NONE					
DDT (Dichlorodiphenyl trichloroethane	50293	A-1 N-0.5	GF-719 Note	NS274	1.5	90			
DECABORANE	17702419	A-0.25,0.75S		NONE					
DEMETON	8065483	O-0.1	MFX4-115	N5514	0.2-1.0	30-500	0.1	0.08	25/7
DIACETONE ALCOHOL	123422	A-238	CT-103	N1402	0.01-0.2	1-10	10	0.104	-4/7
DIAZINON	333415	A-0.1	GGX5-215	O62	1.0	480	3	0.053	22/17
DIAZOMETHANE	334883	A-0.34	X9-101	N2515	0.2	6-30	2-8	.084	25/28
DIBORANE	19287457	O-0.1		NONE					
2-N-DIBUTYLAMINOETHANOL	102818	A-14	S4-127	N2007	0.01-0.2	4-24	5	0.056	25/28
DIBUTYL PHENYL PHOSPHATE	2528361	A-3.5		NONE					
DIBUTYL PHOSPHATE	107664	O-5,10S	TF-2XX Note	N5017	1-3	50-250	70	0.054	25/7
DIBUTYL PHTHALATE	84742	A-5	MF-101	N5020	1.0-3.0	10-200	10	0.057	25/6

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
DICHLOROACETYLENE	7572294	O-0.39C		NONE					
o-DICHLOROBENZENE	95501	A-150 O-300C	CT-101	N1003	0.01-0.2	1-60	10	0.068	25/7
p-DICHLOROBENZENE	106467	A-60 O-675S	CT-101	N1003	0.01-0.2	1-10	10	0.052	25/7
3,3'-DICHLOROBENZIDINE 29CFR1910.1007	91941	A2		NONE					
1,4-DICHLORO-2-BUTENE	764410	A-0.025		NONE					
DICHLORODIFLUOROMETHANE	75718	A-4950	C1CT-110	N1018	0.01-0.05	1-4	30	0.064	25/7
1,3-DICHLORO-5,5- DIMETHYL HYDANTOIN	118525	A-0.2,0.4S		NONE					
1,1-DICHLOROETHANE	75343	O-400	CT-101	N1003	0.01-0.2	0.5-15	10	0.057	25/7
1,2-DICHLOROETHYLENE	540590	O-790	CT-101	N1003	0.01-0.2	0.2-5	10	0.052	25/7
DICHLOROETHYL ETHER	111444	A-29,58S	CT-101	N1004	0.01-1.0	2-15	10	0.059	25/7
DICHLOROFLUOROMETHANE	75434	O-40	C4C3-101	N2516	0.01-0.05	0.25-3	50	0.061	25/7
1,1-DICHLORO-1-NITROETHANE	594729	O-10	C7-101	N1601	0.01-1.0	1-15	10	0.055	25/5
DICHLOROPROPENE	542756	A-4.5		NONE					
2,2-DICHLOROPROPIONIC ACID	75990	A-5.8		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
DICHLOROTETRAFLUORO-ETHANE	74142	A-6990	C1CT-110	N1018	0.01-0.05	1-4	30	0.064	25/7
DICHLORVOS	62737	A-0.9	GGX5-215	O62	1.0	480	0.92	0.103	25/28
DICROTOPHOS	141662	A-0.25		NONE					
DICYCLOPENTADIENE	77736	A-27		NONE					
DICYCLOPENTADIENYL IRON	102545	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
DICYCLOPENTADIENYL IRON	102545	0-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
DIELDRIN	60571	A-0.25	GF-226 Note	NS283	1.5	180			25/28
DIETHANOLAMINE	111422	A-2	MI[11]-262	N3509	0.5-1.0	5-300	7-20	0.064	20/21
DIETHYLAMINE	109897	A-15,45S	XG-781	O41	0.2	10	160	0.071	25/28
2-DIETHYLAMINOETHANOL	100378	A-9.6	S4-127	N2007	0.01-0.2	4-24	5	0.056	25/28
DIETHYLENE TRIAMINE	111400	O-4	X8-756	N2540	0.01-0.1	1-20	0.16	0.06	20/30
DIETHYL KETONE	96220	A-705		NONE					
DIETHYL PHTHALATE	84662	A-5		NONE					

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
DIFLUORODIBROMOMETHANE	75616	A-858	C2C2-106	N1012	0.01-0.2	2.5-10	400	0.09	25/1
DIFOLATAN	2425061	0.1		NONE					
DIGLYCIDYL ETHER (DGE)	2238075	O-0.5,2.8C		NONE					
DIISOBUTYL KETONE	108838	A-145	CT-101	N1300	0.01-0.2	1-10	20	0.07	25/28
DIISOPROPYLAMINE	108189	O-20		NONE					
n,n-DIMETHYL ACETAMIDE	127195	O-35	SG-119	N2004	0.01-1.0	15-80	50	0.067	25/5
DIMETHYLAMINE	124403	A-9.2,27.6S	XD-711	O34	0.2	10	43	0.055	25/17
DIMETHYLANILINE	121697	A-25,50S		NONE					
DIMETHYL CARBAMOYL CHLORIDE	79447	A2		NONE					
DIMETHYLFORMAMIDE	68122	A-30	SG-119	N2004	0.01-1.0	15-80	50	0.067	25/5
DIMETHYLFORMAMIDE	68122	A-30	CT-214	O66	0.2	10	45	0.074	25/15
1,1-DIMETHYLHYDRAZINE	57147	A-1.2 N-0.15C	MB^{12}-8XX Note	NS143	≤1.0	100	2	0.062	4/7
DIMETHYLPHTHALATE	131113	A-5		NONE					

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
DIMETHYL SULFATE	77781	O-0.5	PP-278	N2524	0.01-0.2	0.25-12	0.25	0.073	25/7
DINITOLMIDE	148016	A-5		NONE					
DINITROBENZENE	528290 99650 100254	A-1.0	MFMB[13]-XXX Note	NS214	1.5	90			25/28
DINITRO-o-CRESOL	534521	A-0.2	MFMB[13]-7XX Note	NS166	1.5	180	3	0.075	25/28
DINITROTOLUENE	25321146	A-0.15	GFTN-214	OS44	1.0	60	20	0.08	
DIOXANE	123911	A-90 N-3.6C	CT-101	N1602	0.01-0.2	0.5-15	10	0.054	25/7
DIOXATHION	78342	A-0.2		NONE					
DIPHENYLAMINE	122394	A-10	MB[14]-1XX Note	O22	1.0	25	1.0	0.055	25/15
DIPROPYLENE GLYCOL METHYL ETHER	34590948	O-600,900S	CT-101	0101	1.0	10	510	0.05	25/28
DIPROPYL KETONE	123193	A-233		NONE					
DIQUAT	231367	A-0.5 Total 0.1 Resp		NONE					
di-sec-OCTYL PHTHALATE	117817	A-5,10S	MF-XXX Note	N5020	1-3	10-200	10	0.057	25/6
DISULFIRAM	97778	A-2		NONE					

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
DISULFOTON	298044	A-0.1		NONE					
2,6-di-tert-BUTYL-P-CRESOL	128370	A-10		NONE					
DIURON	330541	A-10		NONE					
DIVINYL BENZENE	1321740	O-50		NONE					
EMERY	1302745	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
EMERY	1302745	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
ENDOSULFAN	115297	A-0.1		NONE					
ENDRIN	72208	A-0.1	MFCB-215	N5519	0.5-1.0	12-400	0.02	0.071	25/7
ENFLURANE	13838169	A-566 N-15.1C	CTCT-101	O29	0.1	10	300	0.080	25/28
EPICHLOROHYDRIN	106898	A-7.6	CT-101	N1010	0.01-0.2	2-30	1	0.057	25/14
EPN	2104645	A-0.1	GF-226	N5012	1.0-2.0	15-700	0.002	0.06-0.08	25/7
ETHANOL	64175	A-1880	CT-104	N1400	0.05	0.1-1.0	10	0.075	0/7
ETHANOLAMINE	141435	A-7.5,15C	S4-127	N2007	0.01-0.2	4-24	5	0.056	25/21

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ETHION	563122	A-0.4		NONE					
2-ETHOXYETHANOL (EGEE)	110805	A-18	CT-105	N1403	0.01-0.05	1-6	10-20	0.059	4/7
2-ETHOXYETHANOL (EGEE)	110805	A-18	CT-105	O79	0.1 TWA 1.0 STEL	48 TWA 15 STEL	78	0.062	4/7
2-ETHOXYETHANOL (EGEE)	110805	A-18	CT-105	O53	0.1	10	60	0.054	4/7
2-ETHOXYETHYL ACETATE (EGEEA)	111159	A-27 N-2.7	CT-101	N1450	0.01-0.2	2-10	20	0.062	4/4
2-ETHOXYETHYL ACETATE (EGEEA)	111159	A-27 N-2.7	CT-101	O79	0.1 TWA 1.0 STEL	48 TWA 15 STEL	6.5	0.057	4/7
2-ETHOXYETHYL ACETATE (EGEEA)	111159	A-27 N-2.7	CT-105	O53	0.1	10	50	0.051	4/7
ETHYL ACETATE	141786	A-1440	CT-101	NS49	0.01-0.2	$\leq$6	7	0.058	25/28
ETHYL ACRYLATE	140885	A-20,61S	CT-101	N1450	0.01-0.2	2-10	20	0.054	25/28
ETHYLAMINE	75047	A-9.2,27.6S	XG-781	O36	0.2	10	29	0.08	25/15
ETHYL AMYL KETONE	541855	O-130	CT-102	N1301	0.01-0.2	1-25	50	0.066	25/28
ETHYL BENZENE	100414	A-434,543S	CT-101	N1501	$\leq$0.2	10-24	1-10	0.089	25/28
ETHYL BROMIDE	74964	A-22 N-1110S	CT-106	N1011	0.01-0.2	0.5-4.0	20	0.054	25/28

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ETHYL BUTYL KETONE	106354	O-230	CT-102	N1301	0.01-0.2	1-25	50	0.086	25/28
ETHYL CHLORIDE	75003	O-2600	C4C3-101	N2519	0.01-0.05	0.5-3.0	10	0.096	25/7
ETHYLENE	74851			NONE					
ETHYLENE CHLOROHYDRIN	107073	O-3C	C7-103	N2513	0.01-0.2	2-35	3	0.076	25/28
ETHYLENEDIAMINE	107153	A-25	X8-756	N2540	0.01-0.1	1-20	0.9	0.06	20/30
ETHYLENEDIAMINE	107153	A-25	X8-756	O60	0.1	10	370	0.055	25/15
ETHYLENE DIBROMIDE	106934	O-30C,50P N-0.13C	CT-258	N1008	0.02-0.2	0.1-25	0.01	0.044	4/7
ETHYLENE DICHLORIDE	107062	O-4,8S	CT-222	N1003	0.01-0.2	1-50	10	0.079	25/7
ETHYLENE DICHLORIDE	107062	O-4,8S	CT-222	O3	0.2	10	0.002	0.067	25/7
ETHYLENE GLYCOL	107211	O-125C	GGS5-164	N5500	0.2	0.3-60	4	0.087	25/15
ETHYLENE GLYCOL DINITRATE	628966	A-0.31 O-0.1S		NONE					
ETHYLENE OXIDE 29CFR1910.1047	75218	A-1.8 N-0.18,9C	CH-256	N1614	0.05-0.15	1-24	1	0.13	25/17
ETHYLENE OXIDE 29CFR1910.1047	75218	A-1.8 N-0.18,9C	CH-256	O50	0.1	24	1	0.13	25/28

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ETHYLENE OXIDE 29CFR1910.1047	75218	A-1.8 N-0.18,9C	PD-211	O49	N/A	N/A	1.3	0.064	25/28
ETHYLENIMINE 29CFR1910.1012	151564	A-0.88	MB[15]-7XX Note	NPCAM300	0.2	≤48	0.3	0.07	25/28
ETHYL ETHER	60297	O-1200,1500S	CT-101	N1610	0.01-0.2	0.25-3	10	0.053	25/28
ETHYL FORMATE	109944	O-300	CT-101	NS36	≤0.2	≤10	unk	0.079	
ETHYLIDENE NORBORNENE	16219753	A-25C		NONE					
ETHYL MERCAPTAN	75081	O-1,25C N-1.3C		NONE					
ETHYL MORPHOLINE	100743	O-23		NONE					
ETHYL SILICATE	78104	A-85		NONE					
FENAMIPHOS	22224926	A-0.1		NONE					
FENSULFOTHION	115902	A-0.1		NONE					
FENTHION	55389	A-0.2		NONE					
FERBAM	14484641	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
FERBAM	14484641	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
FERROVANADIUM DUST	12604589	A-1,3S							

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
FIBROUS GLASS DUST	13344281	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
FIBROUS GLASS DUST	13344281	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
FLUORIDES	16984488	A-2.5	MFX-216	N7902	1-2	12-800	3	0.017	25/28
FLUORINE	7782414	A-1.6,3.1S		NONE					
FONOFOS	944229	A-0.1		NONE					
FORMALDEHYDE 29CFR1910.1048**	50000	A-0.37C	XA-115	N2541	0.01-0.1	1-36	1	0.0052	25/21
FORMALDEHYDE 29CFR1910.1048**	50000	A-0.37C	XB-215	O52	0.10T TWA 0.2S STEL	24T TWA 3S STEL	20	0.073	25/19
FORMALDEHYDE 29CFR1910.1048**	50000	A-0.37C	TFMIMI-8XX Note	N3500	0.2-1	1-100	0.5	0.09	25/30
FORMALDEHYDE 29CFR1910.1048**	50000	A-0.37C	MI-XXX Note	N3501	0.05-0.2	6-18	6	0.058	25/7
FORMAMIDE	75127	N-15 O-30,45S		NONE					
FORMIC ACID	64186	O-9 A-19S		NONE					
FURADAN	1563662	0.1		NONE					
FURFURAL	98011	A-7.9	XA-115	N2529	0.01-0.05	1-12	5	0.076	25/14

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
FURFURAL	98011	A-7.9	C7-174	O72	1.0	180	166	0.054	25/18
FURFURYL ALCOHOL	98000	A-40,60S	PQ-114	N2505	0.01-0.05	3-25	10	0.072	25/7
GASOLINE	8006619	A-890,1480S		NONE					
GERMANIUM TETRAHYDRIDE	7782652	O-0.6		NONE					
GLUTERALDEHYDE	111308	O-0.8C	XA-115	N2531	0.01-0.08	4-39	1	0.087	25/35
GLYCERIN MIST	56815	A-10 Total	P7-500	N0500	1.5-2.0	25-133	200	0.056	25/28
GLYCERIN MIST	56815	O-5 Resp	DOP7-500	N0600	1.7	75-1000	200	0.145	25/28
GLYCIDOL	556525	O-75	CT-111	N1608	0.01-1.0	5-100	1600	0.08	4/7
GRAIN DUST	NUPART	A-4		NONE					
GRAPHITE (except fibers)	7782425	A-2 O-2.5 Resp		NONE					
HAFNIUM	7440586	A-0.5		NONE					
HALOTHANE	151677	A-404 N-16.2C	CTCT-101	O29	0.10	10	190	0.064	25/28
HELIUM	7440597			NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
HEPTACHLOR and HEPTACHLOR EPOXIDE	76448	A-0.05	CB-XXX Note	NS287	0.01-1.0	60			25/28
HEPTANE	142825	N-350,1800S	CT-101	N1500	$\leq$0.2	4	1-10	0.056	25/14
HEXACHLOROBUTADIENE	87683	A-0.21		NONE					
HEXACHLOROCYCLO-PENTADIENE	77474	O-0.1	PPPP-224	N2518	0.05-0.2	0.25-90	0.005	0.082	25/7
HEXACHLOROETHANE	67721	A-9.7	CT-101	N1003	0.01-0.2	3-70	10	0.121	25/7
HEXACHLORONAPHTHALENE	1335871	A-0.2	MF-XXX Note	NS100	1.0	30			25/28
HEXAFLUOROACETONE	684162	A-0.68		NONE					
HEXAMETHYLENE DIISOCYANATE (HDI)	822060	A-0.034 N-0.14C	MI-710	N5521	1.0	5-500	0.1	unk	4/7
HEXAMETHYLENE DIISOCYANATE (HDI) (VAPORS)	822060	A-0.034 N-0.14C	GF-716	O47	1.0	15-240	2.3	0.078	4/28
HEXAMETHYL PHOSPHORAMIDE	680319	A2		NONE					
1,6-HEXANEDIAMINE	124094	A-2.3		NONE					
HEXANE	110543	A-1760,3500S N-350,1800S	CT-101	N1500	$\leq$0.2	4	1-10	0.062	25/14
sec-HEXYL ACETATE	108849	A-295	CT-116	N1450	0.01-0.2	1-10	20	.05-.09	25/28

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
HEXYLENE GLYCOL	107415	A-121C		NONE					
HYDRAZINE	302012	O-0.1 N-0.04C	MB[12]-400	N3503	0.2-1.0	7-100	0.9	0.094	25/6
HYDRAZINE	302012	O-0.1 N-0.04C	FB-436	O20	0.1-1.0	20	1.6	0.057	25/14
HYDROGEN	1333740			NONE					
HYDROGENATED TERPHENYL	61788327	A-4.9		NONE					
HYDROGEN BROMIDE	10035106	A-9.9C	S7-XXX Note	N7903	0.2-0.5	3-100	1	0.074	25/28
HYDROGEN CHLORIDE	7647010	O-7C	S7-XXX Note	N7903	0.2-0.5	3-100	2	0.059	25/28
HYDROGEN CYANIDE	74908	O-5S A-5S	SL-636	N6010	0.05-0.2	0.6-90	1	0.076	25/14
HYDROGEN FLUORIDE	7664393	A-2.6C	MFXX-XXX Note	N7903	1-2	12-800	3	0.116	25/28
HYDROGEN PEROXIDE	7722841	A-1.4		NONE					
HYDROGEN SELENIDE	7783075	A-0.16		NONE					
HYDROGEN SULFIDE	7783064	A-14,21S N-15C	MI-416	NPCAM296	0.15-0.2	5	14	0.066	25/28
HYDROQUINONE	123319	A-2 N-2C	MF-775	N5004	1.0-3.0	30-180	10	0.061	25/7

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
2-HYDROXYPROPYL ACRYLATE	999611	A-2.8		NONE					
INDENE	95136	O-45		NONE					
INDIUM and compounds	7440746	A-0.1		NONE					
IODINE	7553562	A-1C	??-616 Note	N6005	0.5-1	15-225	1	0.085	25/8
IODOFORM	75478	A-10		NONE					
IRON OXIDE FUME	1309371	A-5	MF-367	N7300	1.0-4.0	5-100	1	0.068	25/28
IRON PENTACARBONYL	13463406	A-0.23,0.45S		NONE					
IRON SALTS, soluble as Fe	7439896	A-1	MF-367	N7300	1.0-4.0	5-100	1	0.068	25/28
ISOAMYL ACETATE	123922	O-525	CT-101	N1450	0.01-0.2	1-10	20	0.056	
ISOAMYL ALCOHOL	123513	O-360,450S	CT-103	N1402	0.01-0.2	1-10	10	0.077	0/7
ISOBUTYL ACETATE	110190	O-700	CT-101	N1450	0.01-0.2	1-10	20	0.065	25/28
ISOBUTYL ALCOHOL	78831	O-150	CT-107	N1401	0.01-0.2	1-10	10	0.075	0/7
ISOOCTYL ALCOHOL	26952216	A-266		NONE					
ISOPHORONE	78591	A-28C O-23	C7-101	N2508	0.01-1.0	2-25	20	0.058	25/7

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
ISOPHORONE DIISOCYANATE	4098719	A-0.045 N-0.18S		NONE					
ISOPROPOXYETHANOL	109591	O-105		NONE					
ISOPROPYL ACETATE	108214	O-950,1185	CT-101	NS50	≤0.2	≤9	10	0.067	25/28
ISOPROPYL ALCOHOL	67630	O-980,1225S	CT-104	N1400	0.01-0.2	0.2-3	10	0.075	0/7
ISOPROPYLAMINE	75310	A-12,24S	MB[16]-XXX Note	NS147	1	100			
n-ISOPROPYLANILINE	768525	O-10		NONE					
ISOPROPYL ETHER	108203	A-1040,1300S	CT-101	NS368	0.05	≤3	10	0.056	25/28
ISOPROPYL GLYCIDYL ETHER	4016142	A-238,356S N-240C	CT-101	NS77	≤0.2	≤10	1200	0.067	25/28
KAOLIN	1332587	A-2 Resp O-10 Total		NONE					
KETENE	463514	A-0.86,2.6S		NONE					
LEAD 29CFR1910.1018	7439921	O-0.05	MF-352	N7082	1.0-4.0	200-1200	2.6/samp le	0.03	25/28
LEAD 29CFR1910.1018	7439921	O-0.05	MF-316	N7105	1.0-4.0	1-1500	0.01	N/A	25/28
LEAD ARSENATE 29CFR1910.1018	7784409	O-0.01 N-0.002		NONE					

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
LEAD CHROMATE	7758976	A-0.05 asPb 0.012 asCr		NONE					
LINDANE	58899	A-0.5	GFMB[3]-200	N5502	0.2-1.0	18-240	3	0.086	25/7
LITHIUM HYDRIDE	7580678	A-0.025	MF-355	N7300	1.0-4.0	100-2000	1	0.171	25/28
L.P.G.	68476857	A-1800		NONE					
MAGNESITE	546930	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
MAGNESITE	546930	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
MAGNESIUM OXIDE FUME	1309484	A-10	MF-367	N7300	1.0-4.0	5-200	1	0.084	25/28
MALATHION	121755	A-10	GF-226	N5012	1.0-2.0	15-130	0.004	0.06- 0.08	25/7
MALATHION	121755	A-10	GGX5-215	O62	1.0	60	30.3	0.056	25/17
MALEIC ANHYDRIDE	108316	A-1	MB[17]-736	NPCAM302	$\leq$1.5	360	15	0.063	25/28
MALIEC ANHYDRIDE	108316	A-1	XCX6-719	025	0.1	20	0.097	0.076	25/28
MANGANESE as Mn	7439965	A-5 Dust, 1 Fume N-3S	MF-367	N7300	1.0-4.0	5-200	1	0.062	25/28
MANGANESE CYCLOPENTADENYL TRICARBONYL	12079651	A-0.1		NONE					

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m³)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
MERCURY	7439976	A-0.01 Alkyl, A-0.025 Aryl & Inorganic, O-0.05,0.1C other forms	HD-365	N6009	0.15-0.25	2-100	0.03	0.042	25/30
MESITYL OXIDE	141797	A-60,100S N-40	CT-102	N1301	0.01-0.2	1-25	50	0.071	25/28
METHACRYLIC ACID	79414	A-70		NONE					
METHANE	74828			NONE					
METHANOL	67561	O-260,310S	S3-136	N2000	0.02-0.2	1-5	10	0.063	25/28
METHOMYL	16752775	A-2.5		NONE					
2-METHOXYETHANOL	109864	A-16 N-0.3	CT-XXX Note	O79	0.1T 1.0S	48T 15S	21	0.06	
2-METHOXYETHANOL	109864	A-16 N-0.3	CT-105	O53	0.1	10	300	0.054	
2-METHOXYETHANOL	109864	A-16 N-0.3	CT-105	N1403	0.01-0.05	1-10	10-20	0.068	4/7
2-METHOXYETHYL ACETATE (EGMEA)	110496	A-24 N-0.5	CT-101	O79	0.1T 1.0S	48T 15S	8.4	0.057	
4-METHOXYPHENOL	150765	A-5		NONE					
METHYL ACETATE	79209	A-606,757S	CT-101	NS42	0.01-0.2	≤7	2.0	0.0547	25/28

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
METHYL ACETYLENE	74997	A-1640		NONE					
METHYL ACETYLENE PROPADIENE MIXTURE		A-1640,2050S		NONE					
METHYL ACRYLATE	96333	A-35	CT-101	NS38	0.01-0.2	≤5	10	0.066	25/28
METHYLACRYLONITRILE	126987	A-2.7		NONE					
METHYLAL	109875	O-3100	CT-124	N1611	0.01-0.2	1-3	100	0.06	25/28
METHYLAMINE	74895	A-6.4,19S	XG-XXX Note	O40	0.2	10	35	0.058	25/15
METHYL n-AMYL KETONE	110430	A-233	CT-102	N1301	0.01-0.2	1-25	50	0.066	25/28
n-METHYL ANILINE	100618	O-2		NONE					
METHYL BROMIDE	74839	A-19	C9C8-101	N2520	0.01-1.0	2.5-11	10	0.103	20/7
METHYL n-BUTYL KETONE	591786	A-20 N-4	CT-XXX Note	N1300	0.01-0.2	1-10	20	0.07	4/7
METHYL CHLORIDE	74873	A-103 O-205S	C1CT-110	N1001	0.01-0.1	0.4-3	10	0.052	25/7
METHYL CHLOROFORM	71556	O-1900 N-1900C	CT-101 Note	N1003	0.01-0.2	3-8	10	0.054	25/7
METHYL 2-CYANOACRYLATE	137053	O-6,16S		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
METHYLCYCLOHEXANE	108872	O-1600	CT-101	N1500	≤0.2	4	1-10	0.052	25/14
METHYLCYCLOHEXANOL	25639423	A-234	CT-110	NS374	0.01-0.2	12	100	0.063	25/28
o-METHYLCYCLOHEXANONE	583608	A-229,344S	PQ-114	N2521	0.01-0.05	1-6	90	0.057	25/7
2-METHYLCYCLOPENTADIENYL MANGANESE TRICARBONYL	12108133	A-0.2		NONE					
METHYL DEMETON	8022002	A-0.5		NONE					
METHYLENE BISPHENYL ISOCYANATE (MDI)	101688	A-0.051 O-0.2C	MI[18]-710	N5521	1.0	5-500	0.1	unk	4/7
METHYLENE BISPHENYL ISOCYANATE (MDI) (VAPORS)	101688	A-0.051 O-0.2C	GF-716	O47	1.0	15-240	2.6	0.062	4/28
METHYLENE CHLORIDE	75092	A-174 O-1000C,2000P	CTCT-101	N1005	0.01-0.2	0.5-2.5	10	0.073	25/28
4,4-METHYLENE BIS (2 CHLOROANILINE) MOCA	101144	A-0.11 N-0.003	GF-286	O71	1.0	100	0.44	0.058	25/15
4,4-METHYLENE BIS (2 CHLOROANILINE) MOCA	101144	A-0.11 N-0.003	GGSG-719	N236C	0.2-1.0	7-50			
METHYLENE BIS (4-CYCLO HEXYLISOCYANATE)	5124301	A-0.054 O-0.11C		NONE					
4,4-METHYLENE DIANILINE 29CFR1910.1050	101779	A-0.81		NONE					
4,4-METHYLENE DIANILINE 29CFR1910.1050	101779	A-0.81	GF-286	O57	1.0	100	0.081	0.097	25/15

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
METHYL ETHYL KETONE	78933	A-590,885C	CS-174	O84	0.05	3	236	0.084	22/17
METHYL ETHYL KETONE	78933	A-590,885C	SGSG-183	O16	0.1	3	400	0.059	
METHYL ETHYL KETONE PEROXIDE	1338234	A-1.5C	MI[19]-400	N3508	0.5-2.0	52-520	75	0.052	-4/21
METHYL ETHYL KETONE PEROXIDE	1338234	A-1.5C	XF-706	O77	1.0	15	300	0.074	25/16
METHYL FORMATE	107313	A-246,368S		NONE					
METHYL HYDRAZINE	60344	O-O.35C N-0.08C	MB[12]-816	NS149	1.5	20	0.7	0.106	4/7
METHYL IODIDE	74884	O-10	CT-115	N1014	0.01-1.0	15-50	10	0.07	25/28
METHYL ISOAMYL KETONE	110123	A-234		NONE					
METHYL ISOBUTYL CARBINOL	108112	O-100,165S	CT-103	N1402	0.01-0.2	1-10	10	0.08	0/7
METHYL ISOBUTYL KETONE	108101	O-205,300S	CT-101	N1300	0.01-0.2	1-10	20	0.064	25/28
METHYL ISOCYANATE	624839	A-0.047		NONE					
METHYL ISOPROPYL KETONE	563804	A-705		NONE					
METHYL MERCAPTAN	74931	A-0.98 N-1C		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
METHYL METHACRYLATE	80626	A-410	X6-101	N2537	0.01-0.05	1-8	10	0.063	25/7
METHYL PARATHION	298000	A-0.2		NONE					
METHYL PROPYL KETONE	107879	O-700,875S N-530	CT-XXX Note	N1300	0.01-0.2	1-10	20	0.07	25/28
METHYL SILICATE	681845	A-6		NONE					
alpha-METHYL STYRENE	98839	A-483S N-240	CT-101	N1501	$\le$0.2	3-30	1-10	0.061	25/28
METRIBUZIN	21087649	A-5		NONE					
MEVINPHOS	7786347	A-0.092,0.27S	CB-215	N2503	0.2-1.0	15-240	0.2	0.069	25/7
MICA	12001262	A-3 Resp		NONE					
MINERAL WOOL FIBER	13344281	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
MINERAL WOOL FIBER	13344281	N-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
MOLYBDENUM	7439987	A-5 sol, 10 insol	MF-367	N7300	1.0-4.0	5-67	1.0	0.023	25/28
MONOCROTOPHOS	6923224	A-0.25		NONE					
MORPHOLINE	110918	O-70,105S	SG-128	N2010	0.01-1.0	3-30			

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
NALED	300765	A-3		NONE					
NAPHTHALENE	91203	O-50,75S	CT-101	N1501	≤1.0	200	1-10	0.055	25\28
beta-NAPHTHYLAMINE 29CFR1910.1009	91598	A1	GGS3-118	N5518	0.2-0.8	30-100	0.01	≤0.1	15/22
NEON	7440019			NONE					
NICKEL	7440020	A-0.1 sol 1.0 insol N-0.015	MF-367	N7300	1.0-4.0	5-1000	1	0.027	25/28
NICKEL CARBONYL	13463393	O-0.007	MFCN-379	N6007	0.05-0.2	7-80	0.01	0.099	25/17
NICKEL SULFIDE		N-0.015		NONE					
NICOTINE	54115	A-0.5		NONE					
NITRAPYRIN	1929824	A-10,20S	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
NITRAPYRIN	1929824	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
NITRIC ACID	7697372	O-5,10S	S7-657	N7903	0.2-0.5	3-100	1.0	0.085	25/28
NITRIC OXIDE	10102439	O-30	MT-416	NS321	0.025	1.5	0.3	0.062	25/28
p-NITROANILINE	100016	A-3	MF-706	NS7	1.5	≤90	50	0.054	

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
NITROBENZENE	98953	A-5	SG-119	N2005	0.01-1.0	10-150	20	0.058	25/7
p-NITROCHLOROBENZENE	100005	A-0.64	SG-119	N2005	0.01-1.0	1-150	50	0.054	25/28
4-NITRODIPHENYL 29CFR1910.1003	92933	A1		NONE					
NITROETHANE	79243	A-307	X7-108	N2526	0.01-0.05	1.5-3	unk	0.06	25/7
NITROGEN	7727379			NONE					
NITROGEN DIOXIDE	10102440	A-5.6,9.4S O-1.8S	MS-416	S320	0.05	3			
NITROGEN TRIFLUORIDE	7783542	A-29		NONE					
NITROGLYCERIN	556300	A-0.46 O-0.1S	TN-276	N2507	0.2-1.0	3-100	0.6	0.104	25/25
NITROMETHANE	75525	A-50	CF-2XX Note	N2527	0.01-0.05	1.2-3	unk	0.078	25/7
1-NITROPROPANE	108032	O-90	CF-108	N2528	0.01-0.05	0.1-2	1	0.05	25/7
2-NITROPROPANE	79469	O-35	CF-108	N2528	0.01-0.05	0.1-2	1	0.05	25/7
n-NITROSODIMETHYLAMINE 29CFR1910.1016	62759		XX-XXX Note	O38	0.2-2.0	75	0.2	0.13	
NITROTOLUENE	88722 99081 99990	A-11		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
NITROUS OXIDE	10024972	A-90 N-30	GB-800	N6600	0.1-4.0	5	1 ppm	0.013	25/1
NONANE	111842	A-1050		NONE					
OCTACHLORONAPHTHALENE	2234131	A-0.1,0.3S	MF-XXX Note	NS097	1	30			25/28
OCTANE	111659	A-1400,1750S N-1800C	CT-101	N1500	$\leq$0.2	4	1-10	0.06	25/14
OIL MIST, MINERAL	8012951	A-5 severly refined, .2 mildly refined N-10S		NONE					
OSMIUM TETROXIDE	20816120	A-0.0016, 0.0047S		NONE					
OXALIC ACID	144627	A-1,2S		NONE					
OXYGEN DIFLUORIDE	7783417	O-0.1C		NONE					
OZONE	10028156	A-.01, .45		NONE					
PARAFFIN WAX FUME	8002742	A-2		NONE					
PARAQUAT	4685147	A-0.5 Total 0.1 Resp	TF-736	N5003	1.0-4.0	40-1000	10	0.088	25/7
PARATHION	56382	A-0.1 N-0.05	GF-226	N5012	1.0-2.0	15-700	0.004	0.06-0.08	25/7

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
PARATHION	56382	A-0.1 N-0.05	GGX5-215	OS62	1.0	480	3.1	0.053	22/17
PARTICULATES NOC	NUPART	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
PARTICULATES NOC	NUPART	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
PENTABORANE	19624227	O-.01,0.03S		NONE					
PENTACHLORONAPHTHALENE	1321648	A-0.5	GFMB[3]-200 Note	NS096	1.3	250			
PENTACHLORONITRO- BENZENE	82688	A-0.5		NONE					
PENTACHLOROPHENOL	87865	A-0.5	MFMB[20]-700	N5512	0.5-1.0	48-480	8	0.072	25/8
PENTAERYTHRITOL	115775	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
PENTAERYTHRITOL	115775	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
PENTANE	109660	A-1770,2210S	CT-101	N1500	$\leq$0.02	2	1-10	0.055	25/14
PERCHLOROETHYLENE	127184	A-170,678S	CT-XXX Note	N1003	0.01-0.2	1-10	10	0.092	25/7
PERCHLOROMETHYL MERCAPTAN	594423	A-0.76		NONE					
PERCHLORYL FLUORIDE	7616946	A-13,25S		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
PERFLUOROISOBUTYLENE	382218	A-0.082C		NONE					
PERLITE	93763703	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
PERLITE	93763703	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
PHENOL	108952	A-19 N-60C	MB21-100	N3502	0.2-1.0	26-240	10	0.068	25/5
PHENOL	108952	A-19 N-60C	XG-719	O32	0.1	24	41	0.055	25/15
PHENOTHIAZINE	92842	A-5		NONE					
n-PHENYL-beta-NAPHTHYLAMINE	135886	A2		NONE					
o-PHENYLENEDIAMINE	95545	A-0.1		NONE					
m-PHENYLENEDIAMINE	108452	A-0.1		NONE					
p-PHENYLENEDIAMINE	106503	A-0.1		NONE					
PHENYL ETHER	101848	A-7,14S	CT-101	NS72	≤0.2	≤10	7	0.07	25/28
PHENYL GLYCIDYL ETHER (PGE)	122601	A-0.6 N-6C	CT-101	NS74	≤1.0	≤50	100	0.057	25/28
PHENYLHYDRAZINE	100630	A-0.44 N-0.6C	MB12-400	NS160	≤1.0	100	500	0.06	4/7

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
PHENYL MERCAPTAN	108985	O-2		NONE					
PHENYL PHOSPHINE	638211	A-0.23C		NONE					
PHORATE	298022	A-0.05,0.2S		NONE					
PHOSGENE	75445	A-0.4 N-0.8C	XB-215	O61	1.0	240	14	0.067	23/19
PHOSPHINE	7803512	O-0.4,1S	S8-400	NS332	0.01-0.2	16	0.3	0.091	25/28
PHOSPHORIC ACID	7664382	A-1,3S	S7-657	N7903	0.2-0.5	3-100	2.0	0.096	N/A
PHOSPHORUS (yellow)	7723140	A-0.1	TN-222	N7905	0.01-0.2	5-100	0.005	0.09	25/7
PHOSPHORUS OXYCHLORIDE	10025873	O-0.6 N-3S		NONE					
PHOSPHORUS PENTACHLORIDE	10026138	A-0.85		NONE					
PHOSPHORUS PENTASULFIDE	1314803	A-1,3S		NONE					
PHOSPHORUS TRICHLORIDE	7719122	A-1.1,2.8S		NONE					
PHTHALIC ANHYDRIDE	85449	O-6	MF-784	NS179	1.5	100	5500	.089	25/28
m-PHTHALODINITRILE	626175	A-5		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
PICLORAM	1918021	A-10 Total	P7-500	NO500	1.5-2	25-133	200	0.056	25/28
PICLORAM	1918021	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
PICRIC ACID	88891	A-0.1 N-0.3S	MF-XXX Note	NS228	1.5	180			
PINDONE	83261	A-0.1		NONE					
PIPERAZINE DIHYDROCHLORIDE	142643	A-5		NONE					
PLATINUM	7440064	A-1 metal, 0.002 sol	MF-367	N7300	1.0-4.0	1250-2000	1.0	0.041	25/28
PORTLAND CEMENT	65997151	A-10 total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
PORTLAND CEMENT	65997151	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
POTASSIUM HYDROXIDE	1310583	0-2C	TF-640 Note	N7401	1-4	70-1000	30	0.062	25/7
PROPANE	74986	O-1800		NONE					
PROPANE SULTONE	1120714	A2		NONE					
PROPARGYL ALCOHOL	107197	O-2		NONE					
b-PROPIOLACTONE 29CFR1910.1013	57578	A-1.5		NONE					

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
PROPIONIC ACID	79094	A-30 N-45S		NONE					
PROPOXUR	114261	A-0.5		NONE					
n-PROPYL ACETATE	109604	A-835,1040S	CT-101	N1450	0.01-0.2	1-10	20	0.056	25/28
n-PROPYL ALCOHOL	71238	A-492,614S	CT-107	N1401	0.01-0.2	1-10	10	0.075	-4/7
PROPYLENE	115071			NONE					
PROPYLENE DICHLORIDE	78875	A-347,508S	C7-266	N1013	0.01-0.2	0.1-3.5	0.1	0.064	25/26
PROPYLENE GLYCOL DINITRATE	6423434	O-0.3		NONE					
PROPYLENE GLYCOL MONOMETHYL ETHER	107982	O-360,540S		NONE					
PROPYLENE IMINE	75558	A-4.7		NONE					
PROPYLENE OXIDE	75569	A-48	CT-101	N1612	0.01-0.2	0.5-5	10	0.085	4/28
n-PROPYL NITRATE	627134	A-107 O-170S		NONE					
PYRETHRUM	8003347	A-5	GF-768	N5008	1-3	20-400	10	0.07	25/7
PYRETHRUM	8003347	A-5		NONE					
PYRIDINE	110861	O-15	CT-110	N1613	0.01-1	18-150	20	0.059	25/28

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
QUINONE	106514	O-0.4		NONE					
RESORCINOL	108463	A-45,90S		NONE					
RHODIUM (metal)	7440166	O-0.1		NONE					
RHODIUM (soluble)	7440166	O-0.1		NONE					
RONNEL	299843	A-10	MFCB-215	NS299	1	120	0.2	0.08	25/28
ROTENONE	83794	A-5	TF-768	N5007	1.0-3.0	8-400	4	0.079	25/7
ROUGE		A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
ROUGE		O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
RUBBER SOLVENT (NAPHTHA)	8030306	O-400	CT-101	N1550	0.01-0.2	1.3-20	100	0.05	25/7
SELENIUM	7782492	A-0.2	MF-367	N7300	1.0-4.0	13-2000	1.0	0.068	25/28
SELENIUM HEXAFLUORIDE	7783791	A-0.16		NONE					
SESONE	136787	A-10 total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
SESONE	136787	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
SILICA-AMORPHOROUS	7631869	A-10	P5-500	N7501	1.0-3.0	50-400	5	0.10	25/28
SILICA FUME	69012642	A-2 Resp	DOP5-500	N7501	1.7	50-400	5	0.10	25/28
SILICA FUSED	60676860	A-0.1 Resp	DOP5-500	N7501	1.7	50-400	5	0.10	25/28
SILICA-CRYSTALLINE Cristobalite Quartz Tridymite Tripoli	 14464461 14808607 15468323 1317959	 A-0.05 Resp A-0.1 Resp A-0.05 Resp A-0.1 Resp	DOP5-500	N7500	1.7	400-1000	5	0.09	25/28
SILICON	7440213	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
SILICON	7440213	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
SILICON CARBIDE	409212	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
SILICON CARBIDE	409212	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
SILICON TETRAHYDRIDE	7803625	A-6.6		NONE					
SILVER, metal	7440224	O-0.01	MF-367	N7300	1.0-4.0	250-2000	1.0	0.075	25/28
SILVER, soluble cmpds.	7440224	A-0.01	MF-XXX Note	N7300	1.4	10-400	1	0.075	25/28
SOAPSTONE		A-6 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
SOAPSTONE		A-3 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
SODIUM AZIDE	26628228	A-0.29C		NONE					
SODIUM BISULFITE	7631905	A-5		NONE					
SODIUM FLUOROACETATE	62748	A-0.05		NONE					
SODIUM HYDROXIDE	1310732	A-2C		NONE					
SODIUM METABISULFITE	7681574	A-5		NONE					
STARCH	9005258	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
STARCH	9005258	O-5 Resp	D0P7-500	N0600	1.7	75-100	200	0.043- 0.145	25/28
STEARATES		A-10	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
STIBINE	7803523	O-0.5		NONE					
STODDARD SOLVENT	8052413	A-525 N-350	CT-101	N1550	0.01-0.2	1.3-20	100	0.05	25/7
STODDARD SOLVENT	8052413	A-525 N-350	CT-101	O48	0.2	3	770	0.178	25/15
STRONTIUM CHROMATE, as Cr	7789062	A-0.0005 O-0.1C		NONE					
STRYCHNINE	57249	A-0.15	GF-700	N5016	1.0-3.0	70-100	0.8	0.059	25/7

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
STYRENE	100425	A-213 O-425S	CT-101	N1501	$\le$1.0	5-14	1-10	0.058	
SUBTILISINS	1395217 9014011	A-0.00006S		NONE					
SUCROSE	57501	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
SUCROSE	57501	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043- 0.145	25/28
SULFOTEP	3689245	A-0.2							
SULFUR DIOXIDE	7446095	O-5,10S	MFMC-657	N6004	0.5-1.5	40-200	20	50	25/28
SULFUR HEXAFLUORIDE	2551624	A-5970	GB-XXX Note	NS244	0.05	3-4			
SULFURIC ACID	7664939	A-1,3S	S7-657	N7903	0.2-0.5	3-100	4	0.087	25/28
SULFUR MONOCHLORIDE	10025679	A-5.5C		NONE					
SULFUR PENTAFLUORIDE	5714227	A-0.1C		NONE					
SULFUR TETRAFLUORIDE	7783600	O-0.4C		NONE					
SULFURYL FLUORIDE	2699798	O-20,40S	GB-2XX Note	NS245	0.05-1.0	3	29	0.025	25/28
SULPROFOS	35400432	A-1		NONE					

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** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
2,4,5-T	93765	A-10	GF-719	N5001	1-3	15-200	30	0.053	25/7
TALC	14807966	A-2 Resp	DOP7-500	NPCAM355	1.7	200	10	0.34	25/28
TANTALUM	7440257	A-5		NONE					
TELLURIUM and compounds	13494809	A-0.1	MF-367	N7300	1.0-4.0	25-2000	1.0	0.05	25/28
TELLURIUM HEXAFLUORIDE	7783804	A-0.2		NONE					
TEMEPHOS	3383968	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
TEMEPHOS	3383968	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
TEREPHTHALIC ACID	100210	A-10		NONE					
TEPP	107493	A-0.047	CBCB-XXX Note	N2504	0.01-0.2	3-48	0.1	0.86	25/8
TERPHENYLS	26140603	A-5C	TG-101	N5021	1.0-3.0	2-30	2	0.097	25/28
1,1,1,2-TETRACHLORO-2,2-DIFLUOROETHANE	76119	A-4170	CT-101	N1016	0.01-0.035	0.5-2	300	0.069	25/28
1,1,2,2-TETRACHLORO-1,2 DIFLUOROETHANE	76120	A-4170	CT-101	N1016	0.01-0.035	0.5-2.0	300	0.054	25/28
1,1,2,2-TETRACHLOROETHANE	79345	A-6.9	C7-101	N1019	0.01-0.2	3-30	10	0.057	25/28
TETRACHLORONAPHTHALENE	1335882	A-2		NONE					

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
TETRAETHYL LEAD	78002	O-0.075	X3-229	N2533	0.01-1.0	30-200	0.1	0.087	25/7
TETRAHYDROFURAN	109999	O-590,735S	CT-101	N1609	0.01-0.2	1-9	50	0.055	25/28
TETRAMETHYL LEAD	75741	O-0.075	X6-229	N2534	0.01-0.2	15-100	0.4	0.087	25/7
TETRAMETHYL SUCCINONITRILE	3333526	A-2.8		NONE					
TETRANITROMETHANE	509148	A-0.04	MI[23]-XXX Note	NS224	1	250			
TETRASODIUM PYROPHOSPHATE	7722885	A-5		NONE					
TETRYL	479458	A-1.5		NONE					
THALLIUM	7440280	A-0.1	MF-367	N7300	1.0-4.0	25-2000	1.0	0.043	25/28
THINET	298022	.05		NONE					
4,4-THIOBIS (6-tert-BUTYL m CRESOL)	96695	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
4,4-THIOBIS (6-tert-BUTYL m CRESOL)	96695	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
THIOGLYCOLIC ACID	68111	A-3.8		NONE					
THIONYL CHLORIDE	7719097	A-4.9C		NONE					

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* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
THIRAM	137268	A-1		NONE					
TIN METAL	7440315	A-2	MF-367	N7300	1.0-4.0	35-500	1.0	0.33	25/28
TIN OXIDE and INORGANIC compounds	7440315	A-2		NONE					
TIN ORGANIC compounds	7440315	A-0.1		NONE					
TITANIUM DIOXIDE	13463677	A-10 Total O-5 Resp	MF-353	N7300	1.0-4.0	5-100	1.0	0.051	25/28
TOLUENE	108883	A-188 O-560S	PX-1XX Note	N4000	15min-8hr	N/A	10	0.038	25/14
TOLUENE	108883	A-188 O-560S	CT-101	N1501	$\leq$0.2	2-8	1-10	0.052	25/28
TOLUENE	108883	A-188 O-560S	CT-101	N1500	$\leq$0.2	2-8	1-10	0.052	25/14
TOLUENE 2,4-DIISOCYANATE (TDI)	584849	A-0.036,0.14S	MI-710	N5521	0.2-1.0	5-500	0.1	unk	4/7
TOLUENE 2,4-DIISOCYANATE (TDI) (VAPORS)	584849	A-0.036,0.14S	GF-XXX Note	O47	1.0	15-240	1.3	0.069	4/28
TOLUENE 2,4-DIISOCYANATE (TDI)	584849	A-0.036,0.14S	MB^{24}-1XX Note	O18	1.0	20	1.0	0.055	
o-TOLUIDINE	95534	A-8.8	SG-112	N2002	0.02-1.0	10-150	10	0.06	25/7
m-TOLUIDINE	108441	A-8.8	SG-112	N2002	0.02-1.0	10-150	10	0.06	25\7

Note: Call OEMI at DSN 240-3214 for guidance before sampling.
* - Temperature in degrees centigrade.
** - See IH Notes in IH sampling section.

Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
p-TOLUIDINE	106490	A-8.8	SG-112	N2002	0.02-1.0	10-150	10	0.06	25\7
TRIBUTYL PHOSPHATE	126738	A-2.2	MF-217	NS208	1.5	≤100	2.0	0.076	25/28
TRICHLOROACETIC ACID	76039	A-6.7		NONE					
1,2,4-TRICHLOROBENZENE	120821	A-37C		NONE					
1,1,2 TRICHLOROETHANE	79005	O-45	CT-101	N1003	0.01-0.2	2-60	10	0.057	25/7
TRICHLOROETHYLENE	79016	A-269,537S	CT-101	N1022	0.01-0.2	1-30	10	0.082	25/28
TRICHLOROFLUOROMETHANE	75694	O-5600C	C1-101	N1006	0.01-0.05	0.3-7	2000	0.072	25/7
TRICHLORONAPHTHALENE	1321659	A-5	MB^3-XXX Note	NS128	1.3	100			
1,2,3-TRICHLOROPROPANE	96184	A-60	CT-101	N1003	0.01-0.2	0.6-60	10	0.068	25/28
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131	O-7600,9500S	CT-101	N1020	0.01-0.05	0.1-3	5	0.07	4/28
TRIETHANOLAMINE	102716	A-5		NONE					
TRIETHYLAMINE	121448	20.7S A-4.1		NONE					
TRIFLUOROBROMOMETHANE	75638	A-6090	C1CT-110	N1017	0.01-0.05	0.3-1	50	0.065	

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
TRIMELLITIC ANHYDRIDE	552307	A-0.04C		NONE					
TRIMETHYLAMINE	75503	A-12,36S		NONE					
TRIMETHYL BENZENE	25551137	A-123		NONE					
TRIMETHYL PHOSPHITE	121459	A-10		NONE					
2,4,6-TRINITROTOLUENE	118967	A-0.05	GFTN-214	O44	1.0	60	21	0.082	25/19
TRIORTHOCRESYL PHOSPHATE	78308	A-0.1	MF-217	NS209	1.5	≥100	0.05	0.086	25/28
TRIPHENYL AMINE	603349	A-5		NONE					
TRIPHENYL PHOSPHATE	115866	A-3	MF-217	NS210	1.5	≥100	10	0.066	25/28
TUNGSTEN	7440337	A-5,10S Insol 1.3S Sol	MF-355	N7074	1.0-4.0	200-1000	S50 I125	S.055 I.056	25/14
TURPENTINE	8006642	A-556	CT-101	N1551	0.01-0.2	1-10	100	0.055	25/7
URANIUM	7440611	A-0.2,0.6S		NONE					
n-VALERALDEHYDE	110623	O-175	XA-115	N2536	0.01-0.04	0.5-10	2	0.073	25/28

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
VANADIUM PENTOXIDE	1314621	O-0.05, 0.5C Resp 0.1C Fume	DOP5-XXX Note	N7504	1.7	200-1000	9	0.083	25/28
VEGETABLE OIL MISTS	OILMIST	A-10 Total	P7-500	N0500	1.5-2	25-133	200	0.056	25/28
VEGETABLE OIL MISTS	OILMIST	O-5 Resp	D0P7-500	N0600	1.7	75-1000	200	0.043-0.145	25/28
VINYL ACETATE	108054	O-30 N-15	CG-135	NPCAM 278	≤0.1	≤3	0.5	0.08	4/7
VINYL ACETATE	108054	O-30 N-15	XE-182	O51	0.1	24	40	0.0580.11	25/18
VINYL BROMIDE	593602	O-20	C1-176	N1009	0.01-0.2	2-10	8	0.09	25/14
VINYL CHLORIDE	75014	A-13 O-5C	C2C2-101	N1007	0.05	0.7-5	0.04	0.06	25/10
VINYL CHLORIDE	75014	A-13 O-5C	CS-174	O75	0.05	3	51	0.067	25/15
4-VINYL CYCLOHEXENE	100403	A-0.4		NONE					
VINYL CYCLOHEXENE DIOXIDE	106876	A-57		NONE					
VINYLIDENE CHLORIDE	75354	O-4 A-79S	CT-1XX Note	N1015	0.01-0.2	2.5-7	7	0.048	25/7
VINYL TOLUENE	25013154	A-242,483S	CT-101	N1501	≤0.2	10-24	1-10	0.061	25/28
VM&P NAPHTHA	8032324	O-1350, 1800S	CT-101	N1550	0.01-0.2	1.3-20	100	0.05	25/7
WARFARIN	81812	A-0.1	TF-719	N5002	1.0-3.0	250-1000	2.5	0.056	25/7

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Analyte	CAS No.	OEL (mg/m^3)	Collect Method*	Analysis Method	Rate (Lpm)	Vol (L)	LOD (ug)	SAE	Hold (T/D)*
WELDING FUMES (NOC)	WELD	A-5	MF-35X	N7200	1.0	10-400	2.0	see method	25/28
WOOD DUST	NUPART	A-1 Hard 5 Soft		NONE					
XYLENE	1330207 95476 108383 106423	A-434,651S	CT-101	N1501	≤0.2	12-23	1-10	0.06	25/28
m XYLENE alpha,alpha-DIAMINE	1477550	A-0.1C		NONE					
XYLIDINE	1300738	A-2.5	SG-112	N2002	0.02-0.2	3-30	10	0.057	25/7
YTTRIUM	7440655	A-1	MF-355	N7300	1.0-4.0	5-1000	1.0	0.053	25/28
ZINC CHLORIDE FUME	7646857	A-1,2S		NONE					
ZINC CHROMATES as Cr	13530659111 03869 37300235	A-0.01 N-0.001		NONE					
ZINC OXIDE	1314132	A-10 Total O-5 Resp	P8-900	N7502	1.0-3.0	10-400	5.0	0.088	25/28
ZIRCONIUM and compounds	7440677	A-5,10S	MF-355	N7300	1.0-4.0	5-200	1.0	0.049	25/28

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* - Temperature in degrees centigrade.
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Impinger Fluid

1	10 ml 0.01 N Sodium Hydroxide
2	10 ml of Alkaline Hydroxylamine
3	15 ml of Iso-octane
4	15 ml Sodium Bicarbonate/Sodium Carbonate Buffer Solution
5	10 ml 0.1% Sulfamic Acid
6	15 ml 0.02% Potassium Iodide
7	10 ml "Derivatizing Reagent"
8	10 ml Buffer (Formate) Hydroxylamine Solution
9	10 ml of 0.1 N Potassium Hydroxide
10	10 ml Sodium Hydroxide
11	15 ml of 2mM Hexanesulfonic Acid
12	15 ml of 0.1 M Hydrochloric Acid
13	10 ml of Ethylene Glycol
14	15 ml Isopropanol
15	15 ml of Folin's Reagent
16	10 ml of 0.05 M Sulfuric Acid
17	15 ml of Distilled Water
18	15 ml 1-(2-Methoxyphenol)-Piperazine in Toluene
19	15 ml of Dimethyl Phthalate
20	15 ml of Ethylene Glycol
21	15 ml 0.1 N Sodium Hydroxide
22	15 ml of 0.3 N Hydrogen Peroxide
23	15 ml Ethyl Acetate
24	15 ml Nitro Reagent in Toluene

Collection Methods

AL	Alumina Tube, 100mg/50mg
CB	Chromosorb 102 Tube, 100mg/50mg
CD	Chromosorb 104 Tube, 150mg/75mg
CF	Chromosorb 106 Tube, 100mg/50mg
CG	Chromosorb 107 Tube, 300mg + 50mg set
CH	Charcoal Tube (Treated), Petroleum base, 100mg/50mg
CM	Charcoal Tube (Treated), Coconut base, 100mg/50mg
CN	Charcoal Tube, Low Nickel, Coconut base, 120mg/60mg
CO	Composite
CP	Gaschrom^R P Tube, 50mg
CR	Charcoal Tube, Coconut base, 350mg/350mg/350mg
CS	Carbosieve S-III Tube, 130mg/65mg
CT	Charcoal Tube, Coconut base, 100mg/50mg
C1	Charcoal Tube, Coconut base, 400mg/200mg
C2	Charcoal Tube, Coconut base, 150mg
C3	Charcoal Tube, Coconut base, 200mg
C4	Charcoal Tube, Coconut base, 400mg
C5	Charcoal Tube, JXC base, 100mg/50mg
C6	Charcoal Tube, JXC base, 700mg/390mg
C7	Charcoal Tube, Petroleum base, 100mg/50mg
C8	Charcoal Tube, Petroleum base, 200mg
C9	Charcoal Tube, Petroleum base, 400mg
DO	10 mm Dorr-Oliver Cyclone
DR	Drying Tube, Sodium Sulfate, 270mg
DT	Detector Tube
FB	Firebrick Tube, 300mg
FS	Florosil^R Tube
GB	Gas Bag

GF	Glass Fiber Filter, 37 mm
GG	Glass Fiber Filter, 13 mm
GR	Grab Sample
GS	Greenberg-Smith Impinger
HD	Hydrar in single section, 200mg
HO	Hopcalite Tube
IN	Direct-Reading Instrument
LS	Liquid Sorbent Badge, 0.01 N Sulfuric acid
MB	Midget Bubbler
MC	Whatman 40 Cellulose Ester Filter
MF	Mixed Cellulose Ester (MCE) Filter, 0.8 um, 37 mm
MG	MCE Filter, 0.45-1.2 um, 25 mm, conductive cowl
MH	MCE Filter, 0.45 um
MI	Midget Impinger
MS	Molecular Sieve Tube, Treated with TEA, 400mg/200mg
MT	Molecular Sieve Tube, Treated, 400mg/800mg/400mg
PA	Passive Dosimeter,SKC No. 540-02, Ammonia Monitor
PD	Passive Dosimeter, Dupont Pro-tek^{R}, G-AA Air Monitoring
PE	Passive Dosimeter, 3M No. 3551, Ethylene Oxide Monitor
PF	Passive Dosimeter, 3M No. 3721, Formaldehyde Monitor
PL	Passive Dosimeter, Landauer, Nitrous Oxide Monitor
PM	Passive Dosimeter, 3M No. 3500, Organic Vapor Monitor
PP	Poropak^{R} P Tube, 100mg/50mg
PQ	Poropak^{R} Q Tube, 150mg/75mg
P2	Polyvinyl Chloride (PVC) Filter, 0.2 um
P5	PVC Filter, 5 um, 37 mm
P6	PVC Filter, 0.6 um
P7	PVC Filter, 5 um, 37mm, tared

P8	PVC Filter, 0.8 um, 25 mm
SG	Silica Gel Tube, 150mg/75mg
SL	Soda Lime Tube, 600mg/200mg
SM	Silver Membrane Filter
S1	Silica Gel Tube, Treated, 200mg/100mg
S2	Silica Gel Tube, Treated, 400mg/200mg
S3	Silica Gel Tube, 100mg/50mg
S4	Silica Gel Tube, 300mg/150mg
S5	Silica Gel Tube, 520mg/260mg
S6	Silica gel Tube, Treated w/ sulfuric acid, 150mg/75mg
S7	Silica Gel Tube, Treated, glass fiber filter plug, 400mg/200mg
S8	Silica Gel Tube, Treated w/ mercuric cyanide, 300mg/150mg
TB	Thermosorb N Tube
TF	Polytetrafluoroethyle Teflon^R Filter (PTFE), 1 um
TG	PTFE Filter, 2 um, 37 mm
TN	Tenax Tube, 100mg/50mg
TT	Thermosorb Tube
T1	Tenax Tube, 20mg/10mg
T2	Tenax Tube, 30mg/15mg
T3	Tenax Tube, 50mg/25mg
T4	Tenax Tube, 70mg/35mg
T5	Tenax Tube, 35mg + 17mg set
XA	XAD-2 Tube, Treated, 120mg/60mg
XB	XAD-2 Tube, Treated, 150mg/75mg
XC	XAD-2 Tube, Treated, 450mg/225mg
XD	XAD-7 Tube, Treated, 80mg/40mg
XE	XE-347 Tube, Amber sorb, 160mg/80mg
XF	XAD-4 Tube, 80mg/40mg
XG	XAD-7 Tube, 100mg/50mg
XH	XAD-T Tube, 175mg

X1	XAD-2 Tube, 80mg/40mg
X2	XAD-2 Tube, 100mg/30mg
X3	XAD-2 Tube, 100mg/50mg
X4	XAD-2 Tube, 150mg/75mg
X5	XAD-2 Tube, 270mg/140mg
X6	XAD-2 Tube, 400mg/200mg
X7	XAD-2 Tube, 600mg + 300mg set
X8	XAD-2 Tube, Treated, 80mg/40mg
X9	XAD-2 Tube, Treated, 100mg/50mg

Work Center Codes

1XX	General Chromatographic Analysis (GC/FID)
2XX	Special Chromatographic Analysis (GC with detector other than FID)
3XX	Metal Analysis
4XX	Colorimetric Analysis
5XX	Gravimetric/Physical Observations
6XX	Volumetric/Electrometric Analy
7XX	Ion Chromatography/Liquid Chromatography/High Pressure Liquid Chromatography
8XX	Spectrometric Analysis
9XX	Special Modification
1XXX	Special Analysis (Bulk Industrial Products)
8XXX	Liquid/Compressed Gas
9XXX	Analysis of Biological Materials

Eluents/Analytical Media

00	Unassigned
01	Carbon Disulfide
02	1% Methanol/Carbon Disulfide
03	5% Isopropanol/Carbon Disulfide
04	1% Isobutanol/Carbon Disulfide
05	5% Methanol/Methylene Chloride
06	Isopropanol
07	1% Isopropanol/Carbon Disulfide
08	Ethyl Acetate
09	Benzene
10	Methylene Chloride
11	Tetrahydrofuran
12	95% Ethanol
13	Dilute Sulfuric Acid
14	Acetone
15	Toluene
16	Special Eluent
17	Ethyl Ether
18	0.05% Acetic Acid/Isopropanol
19	Methanol
20	Freon 113
21	Formic Acid
22	Xylene
23	Carbon Tetrachloride
24	Hexane
25	Petroleum Ether
26	Iso-Octane
27	4:1 Methanol/Water
28	0.1 M Sulfuric Acid/10% Methanol
29	Pentane
30	Alkaline Hydroxylamine Hydrochloride
31	0.005 M Hydrochloric Acid

32	1% Sodium Bisulfite
33	0.1 N Potassium Hydroxide/Methanol
34	0.1 N Sodium Hydroxide
35	Thermal Desorption
36	Distilled Water
37	Ethylene Glycol
38	Hydrochloric Acid/Acetic Acid
39	Alkaline Potassium Iodide
40	0.01 N Hydrochloric Acid
41	0.1 M Sodium Acetate
42	Dimethylphthalate
43	0.3 N Hydrogen Peroxide
44	Methyl Orange
45	Sodium Bicarbonate
46	Diluted Acetic Acid
47	0.001 N Sodium Hydroxide
48	Distilled Water then Isoropyl Alcohol
49	0.1 N Potassium Hydroxide
50	Nitric Acid
51	Group 1 Metals
52	Group 2 Metals
53	Group 3 Metals
54	Group 4 Metals
55	Group 5 Metals
56	Dimethylformamide
57	3 mM Sodium Bicarbonate/2.4 mM Sodium Carbonate
58	99:1 Benzene:Methanol
59	1% Carbon Disulfide/Benzene
60	2% Acetone/Carbon Disulfide
61	0.01 M Nitric Acid
62	2 mM Hexanesulfonic Acid
63	0.5 N Sulfuric Acid
64	2% Propanol/Water

65	1:1 Nitric Acid:Hydrochloric Acid
66	15% Acetone/Cyclohexane
67	4 ml Nitric Acid; 1 ml Perchloric Acid
68	Acetonitrile
69	Methanol/Dichloromethane
70	Trichlorotrifluoroethane
71	3 ml Nitric Acid; 1ml Sulfuric Acid; 1 ml Perchloric Acid; 140 degrees C
72	Matched Weight Filters
73	5% Hydrochloric Acid
74	1% Dimethylformamide/Carbon Disulfide
75	1% Acetic Acid in Water
76	Ethanol, absolute
77	Borate/Carbonate Buffer
78	Diethylether
79	3% Nitric Acid
80	Appropriate Organic Solvent
81	5% (W/V) NBD Chloride in Tetrahydrofuran
82	95:5 Methylene Chloride:Methanol
83	Dimetyl Sulfoxide
84	Aqueous Ammonia
85	0.01 N Sodium Hydroxide
86	1 ml 0.5 N Sodium Hydroxide/2ml Toluene
87	0.1 N Hydrochloric Acid
88	3 ml 0.17 N Sodium Hydroxide; 2 ml Toluene
89	50:50 (v/v) 2-Propanol:Toluene

Notes on Sampling
Sampling for Asbestos

Sample Types: There are five types of asbestos samples; each serves a unique purpose. Knowing what type of sample you need before you sample is essential in order to select the proper sampling parameter.

a. Occupational Exposure Sample. This is a breathing zone (BZ) sample collected for compliance and industrial hygiene purposes. OSHA requires adherence to rigid sampling parameters, called the OSHA Reference Method, described under Air Sampling in this section.

b. Abatement Area Sample. This is an area sample taken in a work space where asbestos is being abated. The resulting concentration will indicate if applied work practices are minimizing airborne asbestos releases and if the proper level of respiratory protection is being utilized.

c. Ambient Sample. This is an area sample taken outside the asbestos abatement work area; most often near the entrances and exits of plasticized containment areas, or next to the negative air unit's exhaust. The resulting ambient concentrations will indicate if the abatement containment efforts are working as intended and preventing workers or passers-by not involved with the abatement from being exposed to asbestos. Ambient samples also include any general area sample taken to assess the airborne asbestos concentration, such as outdoors, offices, schools, and pre-abatement and post-abatement backgrounds.

d. Clearance Sample. This is an area sample taken inside the plasticized abatement area, or otherwise contained or regulated work space and ideally under 'aggressive' conditions. The result of a clearance sample is used exclusively for the release of the abatement contractor when compared against an arbitrarily set concentration and analytical method; usually the EPA recommended concentration of 0.01 f/cc by PCM. Clearance samples and aggressive sampling are explained in detail in the EPA publication 560/5-85-024, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (alias 'Purple Book'). Also, 40 CFR Part 763, Asbestos-Containing Materials in Schools (known as the 'AHERA Rules') specifies the stringent procedures on how schools are to be cleared.

e. Bulk Sample. This is for batch identification of asbestos in building materials, mechanical parts and other products. EPA designates products with more than 1% asbestos as asbestos-containing materials (ACM) and requires proper abatement, treatment and disposal. OSHA makes no such designation and is concerned about occupational exposures that can result, whatever the percentage of asbestos. Bulk sampling procedures and supplies are given later in this section.

Types of Analysis:

a. Bulk, Polarized Light Microscopy (PLM). PLM with dispersion staining is used to analyze bulk samples. PLM is usually very specific, but some non-asbestiform silicated amphiboles, such as fibrous tremolite can compromise its specificity. PLM analysis reports an asbestos percentile range due to the subjective and inaccurate nature of the estimation. See bulk sampling for procedures and supplies.

b. Air, Phased Contrast Microscopy (PCM). PCM is the most common method of analysis for airborne asbestos samples. PCM is only relatively accurate due to its dimensional counting rules and optical resolution limitations. Fibers will be counted as asbestos if their length-to-width ratio is 3 to 1, and the fibers are longer than 5 microns (um). Because some fibers may fall within the asbestos fiber parameters and be considered "OSHA Fibrous", non-asbestos fibers will be counted as asbestos.

c. Air, Electron Microscopy. Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM) are the two electron microscopy techniques commonly used for asbestos analysis. Their major advantages are their ability to count smaller fibers than PCM and to identify the type of fiber. Their major disadvantages are high cost (10-20 times PCM), tedious analysis and lengthy result turnaround time. The asbestos exposure standard was developed with PCM data, hence there is no relevant standard with which to compare TEM or SEM results, and SEM has no accepted standard method. Also, because TEM sees thinner fibers than PCM, and TEM counting rules require the counting of fibers as short as 0.5 μm, TEM results are

usually 10 to 100 times the PCM result unless the PCM counted fibers were not asbestos. Therefore, TEM or SEM should not be used unless there is a special reason.

Air Sampling:

a. OSHA Reference Method (ORM). Law mandates that asbestos analysis of occupational air samples be done in accordance to OSHA rules. Not only is the analysis regulated, but also the sampling method. The complete ORM is printed in 29 CRF 1910.1001 Appendix A. Briefly, a few pointers on ORM sampling:

(1) Use a 25 mm cassette for all breathing zone exposure monitoring.

(2) A mixed cellulose ester filter membrane with a pore size of 0.8 um or 1.25 um must be used. We recommend ordering and using only 0.8 um filters that have been factory prescreened for background fibers.

(3) The sampling flow rate must be between 0.5 and 2.5 Lpm. Use 2.5 Lpm for standardization unless circumstances deem otherwise. For monitoring area concentrations, use between 1 and 16 Lpm. If high flow area sampling is to be done, we recommend using 12 Lpm for standardization.

(4) Do all asbestos sampling open face. The 25 mm cassette must have a 50 mm extension cowl that is electrically conductive.

(5) During sampling, static charges can accumulate on the cassette cowl which will reduce the sample's fiber collection efficiency. Ideally, the complete cassette body should be the black conductive type and grounded by wire to some metal fixture, i.e., plumbing, railing, electrical outlet, etc. Realistically, grounding a breathing zone sample is impractical, but it still helps to use a conductive cowl with a black conductive filter base connected to conductive tubing. The black stripe in clear plastic tubing is graphite which makes the tubing conductive. It is particularly important to ground high volume, long duration samples which have the greatest potential for building up static charges. Area sampling with an AC voltage hi-flow pump that has a grounded plug makes it easy to ground the cassette cowl to the pump's frame.

b. Detection Limit. When analyzing asbestos samples the limit of detection can vary and is based on known variables, such as microscope field area, filter area and optical resolution, and on changing variables, such as air volume, number of fields counted and number of fibers counted. Most of these variables can be controlled except for the number of fibers deposited on the filter. This fact creates a unique uncertainty in asbestos sampling. If no fibers are seen in the 100 filter fields viewed, the possibility still exists that fibers were present either on the rest of the filter, or in the air of the sampled area.

(1) Area Sampling. For zero, or near zero fiber counts the Limit of Reliable Quantification (LOQ) varies directly with the amount of air sampled. In very clean environments which may produce zero fiber counts, collect enough air volume to set the LOQ at the desired level, usually 0.1 f/cc for an "Occupational Exposure Level (OEL)", or 0.01 f/cc for a clearance level. Minimum air volumes for EPA-style LOQ are as follows:

LOQ (f/cc)	Minimum Air Volume (liters)
0.1	27
0.01	269

For those of you who want to calculate your own LOQs, refer to the EPA "Purple Book", section M.1.4.2. AL/OEA's reticule size is 0.00785 mm^2. The LOQ for the ORM (25 mm cassette NIOSH 7400 method) is 0.055 fibers/field. Also, 385 mm^2 is the collection area of a 25 mm diameter filter. LOQ volumes are absolute minimum volumes that are at the very border of statistical soundness. We recommend you only use the EPA-LOQ volumes for area sampling and preferably use LOQ volumes only as a last resort when doing

asbestos air sampling.

(2) Breathing Zone Sampling. The OSHA Reference Method bases its Reliable Limit of Detection (RLD), or sometimes called Reliable Quantitation Limit, on a minimum fiber load of 100 fibers/mm^2 of filter area. In clean environments, this size fiber load requires much more sampled air volume than the LOQs, about ten times as much! Therefore, try to collect as much air as possible in clean environments (at least 2 to 6 times the LOQ) and in dirty work environments, size the sample volume with previous results. Since most compliance samples are limited in time and sample volume (2.5 Lpm and 8 hours max), be aware that the RLD of the sample you collect may not favorably compare with an excursion limit (EL) or OEL. The following are ORM-style detection limits:

Sample Parameters	Air Volume (liters)	RLD (f/cc)
2.5 lpm, 30 min	75	0.51
2.5 lpm, 8 hr	1200	0.03

For those of you who want to calculate your own RLD, follow the calculations in Appendix B to 29 CFR 1918.1001.

c. Sample Shipment

(1) Do not ship sampled cassettes in packing that has high electrostatic charges on its surfaces because it can cause fiber migration from the filter to the cassette walls during shipment. Don't use polystyrene "peanuts"; use only crushed or shredded paper, or plastic 'blister' sheeting.

(2) Each set of samples taken must include 10 percent blanks or a minimum of 2 blanks. The blank results will be averaged and subtracted from the analytical results before reporting.

d. Supplies. (The following are sources of supplies - there may be others. These are not endorsements.)

0.8 μm MCE filter, 25 mm cassette with electrically conductive cowl	MILLIPORE CORP 80 ASHBY ROAD BEDFORD MA 01730 (800) 225-1380
	NUCLEOPORE CORP 7035 COMMERCE CIRCLE PLEASANTON CA 94566 (415) 463-2530
Conductive bubble tubing	SHERWOOD MEDICAL SUPPLY 1915 OLIVES ST ST LOUIS MO 63103-1642 (800) 325-7472
	SKC GULF COAST 9827 WHITHORN DRIVE HOUSTON TX 77095-5027 (800) 225-1309 (715) 859-8050

Bulk Sampling:

a. What to sample: Purposefully identify areas and materials to be sampled based on building specifications and visual observations. Look for:

(1) Friable materials (easily crumbled with light hand pressure).

(2) Exposed and deteriorating nonfriable materials.

(3) Any materials which might be expected to contain asbestos which are/will be subjected to disruptive activity.

Determine the number of individual random samples necessary to make up a collective "sample" for a homogeneous material. EPA recommends three samples for a homogeneous material below 1000 sq ft in area, five samples for area between 1000-5000 sq ft, and seven samples for areas over 5000 sq ft.

b. How to collect a sample: Be careful when collecting a sample. Use a containment device, such as a plastic bag around the sampling device to catch any falling debris. If the material or area designated to be sampled is so friable that wetting is essential, minimize the water used. Lightly mist the ACM and let the sample dry before shipping it to the laboratory. Never soak a sample already in the sampling container.

c. PPE: Use the correct level of personnel protective equipment. A judgment has to be made by the individual taking the sample(s) on the type and amount of protection required. The process of taking bulk samples can arouse a great deal of interest. Be discrete. Taking samples after duty hours may be the best approach, especially if it requires donning of full protective equipment. If respirators are used be sure they are the high efficiency particulate arrestance (HEPA) type.

d. Representative Sample: Collect a representative sample of the material to be sampled by slowly pushing the sampler into the material with a twisting motion until the entire thickness of the material is penetrated. A metal or plastic tube, 1/4 inch or so in diameter, works well for this. The representativeness of the coring is the major quantity setting factor. However, 20 cc or so of material will usually provide an adequate amount for analysis. Place the material in a container. With a single-use sampler, only wet-wipe the exterior before capping. With a reusable coring device, eject the sample into the sample container, wet-wipe the tube and plunger of the sampler. Label the sample; clearly identify the sample with location, date collected, etc.

e. Clean and mark the sample site. Repair the damage caused by sampling. Latex paint, dabbed on wet or dry material is acceptable for friable surfaces. Tape works well for repairing core holes left in jacketed insulation and similar material. It's a good idea to mark and number the sampled spot for future reference; a spray paint red circle works well in a boiler room, but a piece of masking tape with a number marked on it with indelible ink is better for an office ceiling.

f. Multi-layer ACM. In general, when a sample consists of two or more distinct layers or materials, each layer should be treated separately and the results reported by layer (discrete stratum). Specific examples can be found in FR vol 59, # 3, 15 Jan 94, Asbestos NESHAP clarification regarding analysis of multi-layered systems.

g. Bulk sample analysis test method. There is an EPA test method available entitled "Method for determination of Asbestos in Bulk Building Materials" (EPA/600/R-93/116). This method provides clarification and improvements to the 1982 EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (as found in 40 CFR part 763 Appendix A to Subpart F). Copies of the improved method are available by telephoning the National Technical Information Service (NTIS) at (800) 553-6847. The NTIS identifier for the test method is PB93-218576

h. Shipping. Please place all sample containers (the Falcon 1006 petri dishes or the recommended wide mouth jars) in a plastic bag before shipping. One sample for each plastic bag. Do not use the plastic bag as

the sample container. Do not put the AF Form 2751 inside the bags with the sample container. (A number of samples have arrived at the lab broken. They contaminate the other sample containers and the paperwork. We are not set up to perform decontamination procedures so all of the samples, including the unbroken container and the paperwork must be discarded). Place the plastic bags and the sampling form in a box with sufficient packing material.

i. Priority Samples. If the analysis is required on a priority basis, contact the laboratory (DSN 240-3626) to report the problem and the number of samples to expect. On all priority analysis requests, include a letter requesting priority analysis, the reason for the priority, and the name of the person contacted about the request. Please mark the sample forms "PRIORITY" in red. Only five samples at a time may be submitted for bulk asbestos priority analyses. Vinyl floor tiles may not be submitted for priority analysis.

j. Supplies. Submit bulk samples in clean containers, ideally 1 or 2 oz wide mouth clear jars or disposable plastic petri dishes. Below is a list of suitable containers.

1 oz wide mouth, clear plastic jars Catalog No. 109429 Caps for above 1 oz jars Catalog No. 109370	Alco Pa 2810 SW 23 rd St. Oklahoma City OK 73108 (405) 681-4607
clear polystyrene petri dishes round, 50 X 9 mm Catalog No. 1006	Becton Dickinson Labware 2 Bridgewater Ln Lincoln Park NJ 07035
NSN 6640-010-60-6984	(This item is federally stocked)
Straight-Sided Round Bottles Catalog No. 03-320-3B	Fisher Scientific 50 FADEM Road Springfield MD 07081
Squat Form Bottles Catalog No. 16195-044	VMR Scientific P.O. Box 7900 San Francisco CA 94120

Recommended Publications:

a. Guidance for Controlling Friable Asbestos-Containing Materials in Buildings, EPA 560/5-85-024, June 1985 (this is the "Purple Book")

b. A Guide to Respiratory Protection for the Asbestos Abatement Industry, EPA 560-OPTS-86-001, September 1986

c. Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials, EPA 560/5-85-029a, October 1985

NOTE: Request these references from the EPA at (202) 554-1404.

HELP! If assistance is needed on asbestos matters, call AL/OE: Air Sampling Analysis at DSN 240-3626, Bulk Analysis at 240-3626, Industrial Hygiene at 240-3214, or Det 3 AL at (315) 634-2265 (laboratory) or (315) 634-2636 (consultants).

Specific Requirements for Vinyl
Asbestos Floor Tiles

The following requirements must be followed when removing vinyl asbestos floor tiles (these requirements are listed in 29 CFR 1926.1101; Asbestos, Construction Industry)

1. Flooring or its backing shall not be sanded.

2. Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.

3. Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of the resilient sheet floor material is prohibited.

4. All scraping of residual adhesive and/or backing shall be performed using wet methods.

5. Dry sweeping is prohibited.

6. Mechanical chipping is prohibited unless performed in a negative pressure enclosure.

7. Tiles shall be removed intact, unless you can demonstrate that intact removal is not possible.

8. when tiles are heated and can be removed intact, wetting may be omitted.

9. Resilient flooring material including associated mastic and backing shall be assumed to be asbestos-containing unless you determine that it is asbestos free using recognized analytical techniques.

Sampling for Biological Monitoring

Biological monitoring is just one aspect of the total industrial hygiene program. Other aspects include employee physical examinations, protective clothing and equipment, environmental controls, and workplace monitoring. Biological monitoring is a highly sensitive index to exposure of industrial chemicals. However, it is one of the least understood due to ethical limitations concerning research on humans.

Biological monitoring is a young science with many possibilities and numerous advantages in chemical exposure control programs. The first major advocates appeared on the scene in 1954. There have been numerous studies concerning the correlations of the exposure concentrations and the concentrations of body fluids and tissues. More recent studies have been trying to establish biological threshold limits for industrial chemicals.

The American Conference of Governmental Industrial Hygienists (ACGIH) publishes Biological Exposure Indices (BEI) as reference values for exposures to various chemicals. These indices are another tool to aid Industrial Hygienists in the monitoring of the workplace. These BEIs are useful as they detect exposure regardless of the route of exposure. An excellent discussion of the uses and limitations of BEIs is available in the *Documentation of Threshold Limit Values and Biological Exposure Indices.* This should be consulted before designing biological monitoring or interpreting results. Although the results of biological monitoring can be very useful to the BEE, the selection of the specimen type and the interpretation of the results should be left to the toxicologists and physicians. Further information and guidance can be obtained by contacting AL/OEMH (Toxicology) (DSN: 240-2063).

In the table on the next page, the 4 analytes that are routinely analyzed by AL/OEA are listed with collection notes. Please note it is better to use your local clinic laboratories or regional hospitals if possible, because of the short holding times for the samples (time in the mail may make results unreliable).

Analytical methods exist for many other chemicals. To meet the Quality Assurance needs of the analyses, we need prior notice. Contact AL/OEA Technical Support (MSgt Parrish, DSN 240-3626) before collecting a sample so we can make the necessary arrangements. Collection procedures can be found in the NIOSH Analytical Methods Manual or the Documentation of TLVs and BEIs.

An SF 557 must accompany each sample. Please note that a Laboratory Identification Number must be assigned regardless of whether it is analyzed locally or by our laboratory. See the instructions for completing the form at the end of this section.

Determinants	CAS #	Collection Notes		Method	Work Center
		Urine	Blood		
Cholinesterase	CHOLIN	-	1	BC	9000
Lead	743992	2	3	AA (N8003)	9500
Phenol	108952	4	-	GC-FID (N8305)	10400
Zinc Protoporphyrin (screen for lead)	ZN'PR	-	3	HEM	9500

Collection Notes:

1. 7 ml whole blood collected with EDTA. Blood should be separated immediately after drawing. Refrigerate at 2°-8°C. RBS should not be analyzed if hemolyzed or older than 7 days. Serum is stable up to 21 days if refrigerated at recommended temperature.

2. 100 ml aliquot collected in acid rinsed container, preserved with 0.2 mL concentrated HNO_3.

3. 10 ml in heparinized lead free blood collected tubes. Ship at 4°C (refrigerated).

4. Collect two spot urine samples, 50 to 100 ml; one at beginning of work shift, one at end of exposure. Collect in sterile polyethylene screw cap bottle container with a few crystals of thymol preservative. Ship at -4°C (frozen).

Method Notes:
BC- Biochem Kit
AA- Atomic Absorption Spectroscopy
GC-FID- Gas Chromatography with Flame Ionization Detection
HEM- Hematoanalyzer
N8003 and N8305 refer to NIOSH Validated Analytical Methods

INSTRUCTIONS FOR COMPLETING STANDARD FORM 557, MISCELLANEOUS

In accordance with AFR 160-32, paragraph 3, the following instructions are provided for submitting samples to the AL/OEA, 2402 E Drive, Brooks AFB TX 78235-5114. Each sample should be accompanied by an SF 557, Miscellaneous, completed according to the following instructions:

1. Patient Identification. Enter the following information:

   a. Patient's Last Name, First Name, Middle Name (or Initial), Social Security Account Number (SSAN)

   b. The Return Address to which the results are to be mailed.

2. Urgency. Check routine.

3. Specimen/Lab Report No. Leave Blank.

4. Patient Status. Optional.

5. Specimen Source. Enter the type of specimen submitted, such as blood, urine, etc. If the specimen was collected over a period of time, indicate the period of Time and the Volume collected in the Remarks Block.

6. Requesting Physician. Enter the Physician's Name and DSN number.

7. Reported By and Date. Leave Blank.

8. Lab ID No. Enter local ID control number.

9. Remarks. Use as necessary.

10. Test(s).

    a. Date. Enter the date the specimen was collected (enter as YYMMDD).

    b. Time. Enter the time the specimen was collected (use 24-hour clock).

    c. Requested. Enter Name and CAS Number of test requested.

    d. Results. Leave Blank.

Sampling for Chromates

A.. **Background:**

Air Force OELs for hexavalent chromium materials have changed significantly in the past few years due to some new ACGIH TLVs. The most radical change was with strontium chromate ($SrCrO_4$) which went from an OEL of 0.05 mg/m^3 to 0.0005 mg/m^3. Interpretation of the results is complicated because:

1. The analytical methods measure metals only (e.g. Sr and Cr) and not chromate as a compound ($SrCrO_4$).

2. The ACGIH TLVs are written in terms of the chromium atom (Cr), while the OSHA PEL is written in terms of a hypothetical zero valence chromate compound (CrO_3).

3. Exposure to more than one type of chromate is probable during paint removal operations, but the analytical methods can only indirectly distinguish between the chromate types.

4. Analytical methods for the metals of concern have limits of detection, that vary over at least two orders of magnitude.

B. **OELs and LODs for Chromate Exposure (1994):**

Compound	OEL (mg/m^3)	OEL Source	Analytical LODs (ug)
$SrCrO_4$	0.0005 as Cr	8-hr TWA ACGIH	Sr: 0.075 Cr: 0.03
$CaCrO_4$	0.001 as Cr	8-hr TWA ACGIH	Ca: 15 Cr: 0.30
$PbCrO_4$	0.012 as Cr 0.05 as Pb	8-hr TWA ACGIH 8-hr TWA ACGIH	Cr: 0.30
Pb (Inorganic)	0.05 as Pb	8-hr TWA OSHA	Pb: 0.15
$ZnCrO_4$	0.01 as Cr	8-hr TWA ACGIH	Cr: 0.30
Zn (Oxide)	10 as Zn	8-hr TWA ACGIH	Zn: 0.30
$BaCrO_4$	0.05 as Cr	8-hr TWA ACGIH	Cr: 0.30
Ba (soluble cmpds)	0.5 as Ba	8-hr TWA ACGIH	Ba: 0.75
Other Cr^{+6}	0.1 as Cr	Ceiling OSHA	Cr: 0.30

C. **Spray Painting Operations (With ONLY one source of chromate):**

1. Collection of Air Samples: Use 0.8 micron MCE filters (MF) and collect at the rate and time specified in the Sample Parameters Table. Request analysis on the AF Form 2750 for both Chromium (Cr) and the attached metal, for example, Strontium (Sr).

2. Interpretation: There are three potential result scenarios: (a) neither the chromium nor the attached metal are detected, (b) the chromium is not detected but the attached metal is; and (c) the chromium is detected. In scenario (c) it is not important whether or not the attached metal is detected. Examples are given below for hypothetical $SrCrO_4$ primer spraying operations.

a. Neither Detected: For example, 2 hours of sampling (with no other exposure in the day) yields the following results:

Cr	<0.003 mg/m^3
Sr	<0.0007 mg/m^3

At first glance, it looks like the laboratory's analtical method was not sensitive enough to show compliance with the OEL. However, there is more information here than meets the eye. For every Cr atom in the molecule $SrCrO_4$, there is exactly one Sr atom. Therefore, the Sr result can be used with a ratio of atomic weights from the periodic table to calculate the equivalent exposure as Cr.

STEP 1 Use Sr result to calculate the equivalent exposure as Cr.

$$(<0.0007 \text{ mg/m}^3 \text{ Sr}) \times \frac{52 \text{ g/mol Cr}}{87.6 \text{ g/mol Sr}}$$

$$= <0.0004 \text{ mg/m}^3\ SrCrO_4, \text{ as Cr}$$

STEP 2 Calculate the 8-hr TWA using both the Cr and Sr results.

<0.003 mg/m^3 Cr X (2 hrs) ÷ (8 hrs)

= <0.00075 mg/m^3 as Cr, 8-hr TWA (using Cr results)

OR

<0.0004 mg/m^3 Cr X (2 hrs) ÷ (8 hrs)

= <0.0001 mg/m^3 as Cr, 8-hr TWA (using Sr results)

STEP 3 Compare the most sensitive analytical method (the smallest of the two figures) to the chromium standard.

Result	OEL	Conclusion
<0.0001 mg/m^3 8-hr TWA $SrCrO_4$, as Cr	0.0005 mg/m^3	Compliance

b. Only Attached Metal is Detected: For example, results from 3 hours of exposure are as follows:

<0.002 mg/m^3 Cr
0.0009 mg/m^3 Sr

STEP 1 Use Sr result to calculate the equivalent exposure as Cr.

= (0.0009 mg/m^3 Sr) (52 g/mol Cr ÷ 87.6 g/mol Sr)
= 0.0005 mg/m^3 $SrCrO_4$, as Cr

STEP 2 If the equivalent exposure is less than the level reported directly for Cr, use the Sr results to calculate the 8-hr TWA for $SrCrO_4$, as Cr.

= 0.0005 mg/m^3 X (3 hrs) ÷ (8 hrs)
= 0.0002 mg/m^3 8-hr TWA $SrCrO_4$, as Cr

STEP 3 Compare the calculated TWA to the Chromium standard.

Result	OEL	Conclusion
0.0002 mg/m^3 8-hr TWA $SrCrO_4$, as Cr	0.0005 mg/m^3	Compliance

c. The Chromium is Detected: The Chromium result can be compared directly to the chromium standard after TWA calculations. For example, the result of two 4-hour sampling periods are:

Sample 1	Sample 2
0.0015 mg/m^3 Cr	0.005 mg/m^3 Cr
0.0028 mg/m^3 Sr	0.008 mg/m^3 Sr

STEP 1 Calculate the 8-hr TWA using the chromium results.

$$[(0.0015 \text{ mg/m}^3 \text{ Cr}) \text{ X } (4 \text{ hrs}) + (0.005 \text{ mg/m}^3 \text{ Cr}) \text{ X } (4 \text{ hrs})] \div 8 \text{ hrs}$$

$$= 0.0032 \text{ mg/m}^3 \text{ 8- hr TWA } SrCrO_4\text{, as Cr}$$

STEP 2 Compare the calculated TWA to the chromium standard.
NOTE: The attached metal result is not used in this scenario.

Result	OEL	Conclusion
0.0032 mg/m^3 8-hr TWA $SrCrO_4$, as Cr	0.0005 mg/m^3	Respirator usage required. Install engineering controls if feasible.

D. **Paint Removal (With MULTIPLE Sources of Chromates)**:

1. Collection of Air Samples: Use 0.8 micron MCE filters (MF) and collect at the rate and time specified in the Sample Parameter Table. To properly identify and account for all sources of hexavalent chromium during paint removal operations (e.g., sanding and bead blasting), you should request chromium (Cr), barium (Ba), strontium (Sr), lead (Pb), and zinc (Zn) on the sampling form.

2. Interpretation: Interpretation of the analytical results is not trivial, but the following example should illustrate the mathematical procedure for most cases. Results from 2 hours of sampling (with no other exposure during the day) are:

0.016 mg/m^3 Cr
0.013 mg/m^3 Pb
0.0013 mg/m^3 Sr
0.079 mg/m^3 Zn
<0.01 mg/m^3 Ba

Partition Method Example Calculation

<u>STEP 1</u> Calculate equivalent Cr content for chromate compound with most restrictive OEL ($SrCrO_4$), Using Sr analytical results.

= (0.0013 mg/m^3 Sr) (52 g/mol Cr ÷ 87.6 g/mol Sr)
= 0.00077 mg/m^3 $SrCrO_4$, as Cr

<u>STEP 2</u> Compare equivalent Cr to analytical Cr
Note: If equivalent Cr is within 20% of analytical Cr result, all chromium has been accounted for. If Cr is greater than 20%, continue on with the next step.

0.00077 ($SrCrO_4$ as Cr) < 0.016 (analytical Cr)

<u>STEP 3</u> Calculate equivalent Cr for chromate compound with the next most restrictive OEL ($PbCrO_4$), using Pb analytical results.

= (0.013 mg/m^3 Pb) (52 g/mol Cr ÷ 207.2 g/mol Pb)
= 0.0033 mg/m^3 $PbCrO_4$, as Cr

<u>STEP 4</u> Compare equivalent Cr to analytical Cr.
Note: If equivalent Cr is within 20% of analytical Cr result, all chromium has been accounted for. If Cr is greater than 20%, continue on with the next step.

(0.00077 ÷ 0.0033) (i.e. $SrCrO_4$ ÷ $PbCrO_4$ as Cr) < 0.016 (analytical Cr)

<u>STEP 5</u> Calculate equivalent Cr content for chromate compound with 3rd most restrictive OEL ($ZnCrO_4$), using Zn analytical results.

= (0.079 mg/m^3 Zn)(52 g/mol Cr ÷ 65.4 g/mol Zn)
= 0.063 mg/m^3 $ZnCrO_4$, as Cr

<u>STEP 6</u> Compare equivalent Cr to analytical Cr.

0.00077 ÷ 0.0033 ÷ 0.063 > 0.016 (analytical Cr)
(i.e. $SrCrO_4$ + $PbCrO_4$ ÷ $ZnCrO_4$ as Cr)

<u>STEP 7</u> If equivalent Cr is within 20 percent of the analytical result, all chromium has been accounted for. If it is greater than 20 percent, then excess Zn exists. If it is less than 20 percent, then excess Cr exists.

= [(0.00077 ÷ 0.0033 ÷ 0.063) - 0.016] ÷ 0.016
= 3.19 or 319%

Because it is greater than 20%, there is no reason to use the BA result.

<u>STEP 8</u> Determine true $ZnCrO_4$ exposure.

0.016 - (0.00077 ÷ 0.0033)
= 0.012 mg/m^3 true $ZnCrO_4$, as Cr

<u>STEP 9</u> Determine excess metal oxide.

= (0.063 - 0.012)(65.4 g/mol Zn ÷ 52 g/mol Cr)
= 0.065 mg/m^3 Zn oxides, as Zn

STEP 10   Calculate the exposure to the mixture according to Appendix C, ACGIH TLVs. Note that all contaminants share the same target organ (lungs).

$$= (0.00077 \div 0.0005) + (0.0033 \div 0.012) + (0.012 \div 0.01) + (0.065 \div 10)$$
$$= 3.03$$

STEP 11   Calculate 8-hr TWA.

$$= [(3.03 \times 2 \text{ hrs}) + (0 \times 6 \text{ hrs})] \div 8 \text{ hrs}$$
$$= 0.75 \text{ 8-hr TWA}$$

STEP 12   Compare the calculated TWA to the standard.

Result	OEL	Conclusion
0.75	1.0	Compliance

Conservative Method for Example

STEP 1 Calculate 8-hr TWA, relative to $SrCrO_4$ OEL.

$$\frac{\{[(0.016 \ X \ 2 \text{ hrs}) + (0 \ X \ 6 \text{ hrs})] \div 8 \text{ hrs}\}}{0.0005}$$

= 8

STEP 2 Make a decision about effectiveness of controls (relative OEL = 1).

Result	OEL	Conclusion
8	1.0	Non-Compliance Use Respiratory Protection

Sampling for Formaldehyde

1. On 27 May 1992, Occupational Safety and Health Administration (OSHA) amended its existing regulation for occupational exposure to formaldehyde and established a final rule 29 CFR 1910.1048. These final amendments lowered the permissible exposure limits (PEL), added medical removal protection provisions, and supplemented hazard communication and employee training. Specific changes instituted by the final rule include the following:

a. PEL is reduced from 1 ppm to 0.75 ppm measured as an 8 hour time-weighted average (TWA). There was no change in the 8 hour action level of 0.5 ppm or the 15 minute short term exposure level (STEL) of 2 ppm.

b. Exposure monitoring is required if there are reports of signs or symptoms of formaldehyde exposure (i.e., significant eye, nose, or throat irritation and those suffering from dermal irritation or sensitization) and must be performed promptly.

c. Requirements for respiratory protection reflect the change in the 8 hour PEL.

d. The hazard communication amendment states that when potential exposure is under 0.5 ppm, labeling must indicate that formaldehyde may be present, where physical and health hazard information is available, and give the name of a responsible party. If the exposure could potentially exceed 0.5 ppm, the label information must detail all hazards, including potential cancer hazards.

e. Employee training must be conducted on an annual basis for all employees exposed to formaldehyde concentrations at or above 0.1 ppm.

2. According to AFOSH Std 48-8 the ACGIH is the standard used by the Air Force. ACGIH has lowered its formaldehyde TLV to a ceiling limit of 0.3 ppm or 0.37 mg/m^3. It is important to chose a sampling method that has a detection limit below this level. The sampling method that is the most sensitive is NIOSH 3500. It has a detection limit of 0.17 mg/m^3. There are other methods for the detection of formaldehyde. The method most suitable for personnel monitoring is NIOSH 2541. Other methods include NIOSH 3501, OSHA 52 and OSHA ID-205. The following is a summary of the sampling methods available for formaldehyde.

3. NIOSH 3500

a. Fill the two impingers for each sample with 20 ml of 1% sodium bisulfite solution (the 1% sodium bisulfite solution should be prepared just prior to sampling. To make the solution, dissolve 10 grams of sodium bisulfite in 1 liter of distilled water in a glass container). Make cassette-to-impinger and impinger-to-sampling pump connections with flexible, inert tubing. You may want to also insert a second filter/cassette assembly in line between the sampler and sampling pump to trap any liquid which might splash over from the impingers during sampling. A 1-um PTFE filter is necessary when sampling is to be conducted in a dusty environment, which could contribute either a positive or negative interferences to the method. The use of dual impingers in series is recommended to ensure efficient collection of formaldehyde.

b. Sample at an accurately known flow rate of 0.2 to 1 liter/min to give a sample volume of 1 to 100 liters. The working range for this method is 0.025 to 4.6 mg/m^3 for an 80 liter air sample, and a ceiling level of 0.1 ppm for a 15 L air sample.

c. Transfer the contents of the impingers to separate low-density polyethylene bottles for shipping. Sample contamination may occur if glass or polyethylene scintillation vials with "polycone" plastic lined caps are used. Ensure that the front and back impinger samples are placed in separate vials, and are properly labeled "front" and "back", and are given the same sample number.

d. This method has small positive interferences with oxidizable organic materials. It also has

small negative interference with ethanol and higher molecular weight olefins, aromatic hydrocarbons and cyclohexanone. Try to avoid sampling in atmospheres where the above materials are present.

4. NIOSH 2541

   a. Use a XAD-2 tube treated with 2-(Hydroxymethyl) piperidine, 60/120 mg.

   b. Sample at an accurately known flow rate of 0.01 to 0.1 liter/min to give a sample volume of 1 to 36 liters. The working range for this method is 0.3 to 20 mg/m^3 for a 10 liter air sample.

5. OSHA 52

   a. Use a XAD-2 tube treated with 2-(Hydroxymethyl) piperidine, 75/150 mg.

   b. Sample at an accurately known flow rate of 0.1 liter/min to give a sample volume of 24 liters for TWA sampling. Sample at an accurately know flow rate of 0.2 liter/min to give a sample volume of 3 liters for STEL sampling.

   c. This method will not detect below the ACGIH recommended ceiling limit of 0.3 ppm.

6. NIOSH 3501

   a. Use a midget bubble containing 15 ml of Girard T Reagent.

   b. Sample at an accurately known flow rate of 0.05 to 0.2 liter/min to give a sample volume of 6 to 18 liters. The working range for this method is 1.1 to 12 mg/m^3 for an 18 liter air sample. It can be used for peak measurement of 5 to 20 ppm.

7. OSHA ID-205

   a. This method uses a 3M No. 3721 Passive Badge. It is designed to make TWA determinations and is best done by using for an 8 hour sampling period. Refer to the manufacturers instructions for proper use of the badge.

Chemical contaminants are generally not major contributors to Indoor Air Quality (IAQ) problems. However, it may at times be useful to collect air samples to document that chemical exposures are not a factor. Selection of chemicals to sample is based on a walk-through survey of the building; in many cases the decision will be not to sample at all. When sampling is necessary, formaldehyde and total hydrocarbons are the most likely sample collections. See the special instructions below. For other potential contaminants, the standard industrial hygiene sampling method and Occupational Exposure Limit (OEL) will suffice, but be sure to collect as area samples, for at least 6 hours. Turn to the **Indoor Air Quality Program** description for more information on IAQ.

Formaldehyde and Total Hydrocarbons: When building occupants complain of eye or mucous membrane irritation, headache, difficulty concentrating, or unpleasant odors, and there is a potential source of hydrocarbons (such as new furniture or carpet) then sampling for these parameters may be appropriate.

a. Listed below are the parameters for sampling:

ANALYTE	COLLECTION METHOD	SAMPLING TIME	CAS NO.	BLANKS
Formaldehyde	Passive Dosimeter, 3M 3721 (PF)	28 to 32 hrs	50000	1 per set of samples
Formaldehyde (alternate)	2HMP Treated XAD-2 Tubes (XA)	6 to 8 hrs @ 100 cc/min	50000	1 per set of samples
Total Hydrocarbons	Coconut Shell Charcoal Tubes, 100 mg/50 mg (CT)	6 to 8 hrs @ 200 cc/min	THC	1 per set of samples

b. Sample Locations: You should sample for both formaldehyde and total hydrocarbons at the same locations. Sample at desk level or up to two feet above. Sample in each room of concern or if there are numerous rooms, pick representative examples. Sample on every floor if there is more than one floor of concern. Try to pick locations that tend to have a high number of complaints. If possible, also sample in at least one control area that is not experiencing irritation.

c. Interpretation of Results (Formaldehyde): The ACGIH TLV for formaldehyde is a ceiling limit (never to be exceeded) of 0.37 mg/m^3. Researchers have found the eye and nose irritation and headaches due to formaldehyde begin in sensitive persons at about 0.1 mg/m^3. Compare your IAQ sample results to the lower concentration. In most cases, formaldehyde levels are well below irritation levels for sensitive individuals.

d. Interpretation of Results (Total Hydrocarbons): OSHA PELs and ACGIH TLVs for individual compounds start at 100 mg/m^3 as an 8-hour time weighted average (TWA). Researchers have found that reaction to volatile organics by sensitive persons begins at about 2.5 mg/m^3 as total hydrocarbons. Compare your IAQ sample results to this concentration. In most cases, hydrocarbon concentrations are well below levels found to irritate sensitive individuals.

Isocyanate Sampling

A. Background:

1. Isocyanates are chemicals characterized by having functional radical NCO- groups, and are the key ingredients of polyurethane paints. They have been shown to be skin, eye, and respiratory system irritants and potential sensitizers when they come in contact with the skin or respiratory tract. Spraying of isocyanate containing paints potentially exposes the worker to large quantities of aerosolized paint.

2. Isocyanates exist in two basic classes: monomers (usually called diisocyanates); and oligomers (usually called prepolymers or, more often, polyisocyanates). Within each class many different isocyanates exist. For example, the best known monomers are HDI, MDI, and 2,4-TDI. Quite a variety of prepolymers exist and are listed by a number of trade names such as Desmodur N-75, N-100, N-3300, and Z-4370 to name a few.

3. Historically, monomers were considered to be the most hazardous forms of isocyanate. Today, however, most polyurethante formulations contain only a small amount of unreacted monomers and significantly great quantities of partially reacted polyisocyanates. These new formulations were thought to be safer due to the reduced monomer content and decreased vapor pressure, however, when sprayed large amounts of aerosol was produced, negating these benifits.

4. Currently, we are able to analyze air samples for both monomers and prepolymers (polyisocyanates). Be aware that the only established standard for prepolymer exposure are the manufacturer's guidelines (1 mg/m^3). The Air Force is studying prepolymers in order to establish an occupational exposure limit (OEL).

B. Standards:

ANALYTE	OEL TWA (mg/m^3)	SOURCE
1,6-Hexamethylene Diisocyanate (HDI)	0.034	ACGIH
Methylene Bisphenyl Isocyanate (MDI)	0.051	ACGIH
2,4-Toluene Diisocyanate (TDI)	0.036	ACGIH

C. Sampling Methods:

1. NIOSH Method 5521 - This is an impinger method recommended for sampling isocyanate aerosol that can be used to measure both monomers and prepolymers (polyisocyanates). For sampling method parameters see the Sampling Guide entry for 2,4-TDI.

a. The impinger solution is prepared by dissolving 43 milligrams of 1-(2-methoxyphenyl) piperazine in 1 liter of toluene. The toluene used must be High Performance Liquid Chromatography (HPLC) reagent grade. This derivatizing agent and HPLC grade Toluene are commercially available from several chemical supply houses, and must be obtained by each BEE shop that wishes to use this method.

b. The recommended flow rate is 1 liter/min for the recommended volume of 5 to 500 liters. The toluene in the sampling media evaporates during sampling. After approximately 15 minutes of sampling, restore volume to 15 ml with additional HPLC grade toluene. After sampling, transfer

the sample solution to a 20 ml glass vial for shipment. Rinse both impinger parts with 2 to 3 ml toluene and add rinsing to the sample. Cap the vial with a polytetrafluoroethylene (PTFE) lined cap. Refrigerate samples as soon as possible.

c. If analysis for prepolymers is desired, a small bulk sample (2-3 mls) of the prepolymer formulation, which has not been mixed with the pigment, must be submitted along with the air samples, preferably in an amber bottle with a PTFE (Teflon) cap. The bulk sample is used by the analyst for instrument calibration. Label the bulk sample as a support sample and so state in the comments section on the AF Form 2750. No sample number is required for these bulk samples. An MSDS for the prepolymer would greatly aid in identification and quantification of this component.

2. OSHA Method 47 - This is a filter method recommended for sampling isocyanate monomer vapor only (e.g., HDI, MDI, TDI). This method should be used for brush-on or foam-in-place, and sealant/adhesive operations where only vapors are generated. This method contains more derivitizing reagent than the old OSHA 42 method.

a. This method uses a glass fiber filter coated with 1.0 mg of 1-(2-pyridyl) piperazine (1-2PP) which are contained in an open face cassette. The treated filters need to be stored at reduced temperature until used for sampling. The recommended flow rate is 1 liter/min with a recommended volume of 15 liters.

b. Coated filters are prepared by applying 0.5 ml of a 2.0 mg/ml 1-2PP in methylene chloride solution to each glass fiber filter. The wet filters are allowed to air dry in a laboratory hood before placing them in the filter cassettes.

c. Treated cassettes may be obtained for this method by calling the IH Air Analysis Function at DSN 240-3626. Treated cassettes are good for 45 days from the date of preparation and must be refrigerated prior to use. Sampling parameters include: sample rate of 1 liter per minute; collection code - GFXX-716; open-face sampling; volume - 15-240 liters; and, limit of detection of 0.8 $\mu g/m^3$ at 15 liters.

3. For questions or further information on these sampling methods contact Capt. Bell at DSN 240-3214.

Note: Prior to sampling, ensure that you know the exact type of isocyanate you are sampling for. There are numerous types of isocynates which fall into the aromatic and aliphatic categories. Consult the MSDS or manufacturer if you have any questions.

Lead Sample Collection Procedures and Data Interpretation

PAINT CHIP SAMPLES

It is imperative the entire paint chip be removed for the analysis. There are currently three accepted methods for paint chip removal that will minimize the amount of substrate removed. Each chip sample should be at least 1 square inch (consult contract laboratory for specific requirements).
A tray or similar collection device will be necessary to catch any falling debris as all three techniques are fairly messy.

Methods for Paint Chip Removal:

1. Cutting method:

- Using a sharp knife or scalpel, score the area of paint in question to an appropriate size, attempt to lift the paint off by sliding the thin blade along the score and underneath the paint, and remove a section down to the substrate, making sure all layers of paint are intact. Care should be taken to avoid including wood, paper, or plaster in the sample if the analysis results are to be reported in weight of lead as a percent of the weight of the sample.

- Use the brush or mini-vacuum to clean the area and dispose of any residual material in a plastic disposal bag.

2. Punching Method

- Apply clear, pressure sensitive adhesive tape over an area slightly larger than the sample to be collected.

- Cut through the paint layers with a punch and template/sharp knife combination of known area.

- Removal all the paint using a sharp chisel having the same dimensions as a side of the square.

- Use the brush or mini-vacuum to clean the area and dispose of any residual material in a plastic disposal bag.

Samples collected in this manner are for analysis results which are planned to be reported in units of weights of lead per unit area (mg/cm^2). If a small amount of substrate is included with the paint sample, it will not affect the results. What is essential is to include all the paint within the known area, and no more, in the sample.

3. Heat gun:

This method utilizes the fact that paint and substrate materials heat and cool at different rates. It does not work well on plaster, works moderately well on concrete, and works very well on steel and wood. This method should be used only in a well ventilated area, because of possible exposure of the inspector to fumes. With practice, an inspector can effect the removal of an entire paint film, down to , but not including the substrate, Materials needed are a heat gun, 2 sharpened putty knives (one wide, one narrow), and a paint scraper. The technique is as follows:

- Direct hot air from the heat gun about 4 to 6 inches from the surface while pressing the edge of the knife into the paint. Don't overheat (in excess of 700 F) or cause smoking, heat gently to soften the paint.

- Heat for a few seconds, and cool for a few seconds while gently press the knife edge into the paint.

- Use the knife to lift off the paint, scrap the surface with the scraper to remove residual paint, if any.

- Use the brush or mini-vacuum to clean the area and dispose of any residual material in a plastic disposal bag.

After using either method recheck to ensure that the samples are properly labeled for shipment to the laboratory.

- Place the sample into corresponding pre-labeled sample containers. (i.e., zip-lock bag, sterile jar or plastic tube, etc.). Consult with the contract laboratory for specific requirements.

- Using a separate sample container for each paint chip sample.

Result Interpretation

HUD recommends the following action levels of 0.5% by weight or 1.0 mg/cm^2 when laboratory analysis is used. If the laboratory results are to be reported in mg/cm^2 then the paint must be removed down to the bare substrate from a measured surface area; accurate determination of the surface area is important but adherent substrate or other non-paint material will not affect the result. If the laboratory results are to be reported as weight percent then the paint must be removed down to, but not including, the bare substrate; inclusion of substrate materials in the paint sample or not removing all of the paint will affect the results.

Lead Dust

Interior house dust commonly contains lead which originates from outside dirt tracked into the house by people and pets and from normal deterioration of paint. The most common place to find lead in house dust is on window sills and wells. This is because lead-based paint was used on these surfaces more often in the past, and the opening/closing action causes the paint to deteriorate. These areas are usually very difficult to clean and are usually easily accessible to young children. Another common place to find lead in dust is on the floor near windows or doorways.

Collection of 3 samples is recommended (floor, window sill, and window well) per abated or high risk area. The exact location to be sampled should be randomly selected. For example, randomly select a location within a room for the floor sample. Likewise, if a room has several windows, randomly select a window sill and a window well (independently) for sampling. A random number generator on a hand-held calculator, or a table of random numbers, are useful tools for accomplishing random selection.

Procedure:

- Identify the area to be wiped. Use a plastic template with 1 square foot open area when wiping the floor. When window sills and wells are sampled, measure the length and width of the area to be sampled.

- Put on disposable gloves. Use new gloves for each sample.

- Remove a gauze pad from its protective package and discard.

- Remove another pad and moisten with distilled water (baby wipes require no moistening agent). Add enough water to completely moisten the gauze

- Remove a third pad, moisten and place into a plastic bag to be submitted to the laboratory as a blank.

- Place the gauze flat on the surface to be sampled. Wipe in a continuous "S" pattern once over the entire

area (do not scrub), pressing firmly with the palm of your hand. Repeat at a 90 degree angle to the first pattern. Fold the wipe in half, folding the dust into the wipe. Repeat two more swipes, using the same pad now folded in half, at a 90 degree angle to each other for a total of four swipes over the surface. Attempt to collect visible dust. Fold the wipe in half again, folding the dust into the wipe, and place into a sample plastic bag.

- Record location, condition of surface, area sampled, surface type, and surface material

- Submit the samples for laboratory analysis.

Notes:

- Use the same amount of pressure when wiping the surface at each sample location.

- There is no federal standard for lead dust. HUD has recommended the following clearance criteria for abatement work in houses;

-- Floors:	200 $\mu g/ft^2$
-- Window Sills:	500 $\mu g/ft^2$
-- Windows Wells:	800 $\mu g/ft^2$
-- Carpeted Floors	100 $\mu g/ft^2$

Result Interpretation:

Typically, results are reported from the laboratory as total weight of lead present on the wipe. The inspector must then convert the reported results to units of micrograms per square foot (ug/ft^2) for direct comparison to the clearance standards.

EXAMPLE: The laboratory reports 0.08 milligrams (mg) of lead on a wipe taken from a window sill of area 3" by 30". The total area sampled is:

$$(3 \text{ in})(30 \text{ in})(1 \text{ ft}^2/144 \text{ in}^2) = 0.625 \text{ ft}^2$$

The total amount of lead present is

$$(0.08 \text{ mg})(1000 \text{ ug/mg}) = 80\ \mu g$$

Thus, the concentration of lead in the dust is

$$80\ \mu g/0.625 \text{ ft}^2 = 128\ \mu g/ft^2$$

Lead in Soil

As with dust wipe sampling, soil sampling is needed to completely evaluate maximum potential exposure to lead by young children. A composite sample which consists of three to five soil cores mixed together should be taken from each side of the building to achieve a representative sample of the area.

First, prepare a site description. Make a detailed drawing showing: the boundary of the lot; the position of the main building and any other structures such as garages and storage sheds; the position of sidewalks, driveways, and other paved areas; the position of play areas (if clear); the position of areas with exposed soil, roof rain sprouts, and general drainage patterns; the drip lines of the buildings; and, areas of heavy traffic. In addition, describe the location of the property including the following information: (1) type of building construction; (2) condition of main building; (3) condition of the property and nature of adjacent property; (4) fencing and animals on the property; and, (5) use of the property.

The number of samples necessary depends on the area of the exposed soil around the dwelling. If the soil surrounding the dwelling extends less than 6 feet from the foundation, a single composite sample can be taken. This sample should consist of a composite of five soil cores taken randomly at locations within two feet of the building foundation. If more than six feet of soil surrounds the foundation, but the width (distance from the foundation) of the yard is ten feet or less, two composite samples should be taken. One of these samples should consist of five randomly located cores within two feet of the foundation. The other should consist of five cores randomly located at the yard boundary. If the soil area around the dwelling is larger still, wider than sixteen feet and longer than twenty feet, the area should be divided in two, and three composite samples of five cores each should be taken. One sample should consist of cores taken within two feet of the foundation. The second should consist of five random cores in the first half of the yard; and, the third composite should be taken from five cores in the second half of the yard.

Procedure:

- Using measure tape, equally portion each side of unit based on the number of samples to be collected.
- Put on disposable gloves. Use new gloves for each sample.
- Collect one core, no more than 3 inches deep, from each location. Ensure to remove large foreign objects that could effect sample results (rocks, vegetation, sticks, paint flakes, etc.). The remainder of extraneous material will be screened in the laboratory.
- Place each of at least three samples into one plastic bag to make a composite sample.
- Ensure core tool is completely cleaned with DI water after sample to prevent cross-contamination

Laboratory analyses of soil core samples for lead are carried out using either a laboratory XRF instrument, or by acid digestion followed by Atomic Absorption Spectroscopy. The results are reported in parts lead per million parts of soil by weight (ppm). Because 5 soil cores are used to make up a single composite sample, the composite sample lead concentration represents an average soil lead concentration over the area where the cores are taken. For example, the composite taken close to the foundation, and consisting of 5 cores at random locations in this area, represents an estimate of the average soil lead concentration close to the foundation of the dwelling. This captures the impact of weathering of exterior paint on soil lead concentrations near the building.

Result Interpretation

As in the case of leaded dust, there is no Federal health-based standard for levels of lead in soil, although the State of Minnesota recently established a risk-based requirement for abatement of soil with levels above 300 ppm lead. Until a Federal standard is developed, a de facto level of 400 ppm is often accepted as a level of concern for lead in soil. This does not mean that levels exceeding 400 ppm constitute, in and of themselves, an imminent health hazard. Neither should it be inferred that a 400 ppm level is safe, especially in a child's play area. Residents and property owners may wish to take some simple steps to minimize the potential for exposure of children to lead in soil if levels seen in soil exceed 400 ppm.

Sampling for Nitrous Oxide
Using Landauer Passive Dosimeters

NOTE: Use the dosimeter promply after receipt. The dosimeter must be sent back to Landauer within 120 days of the "Begin Wear Date". Unused dosimeters must also be sent back to the manufacturer.

1. **SAMPLING TIME**

a. The dosimeters are intended primarily for breathing zone personal air samples. We recommend they be worn for a full shift.

b. If the dosimeters are to be used for other purposes, Landauer recommends a minimum sampling time of two hours and a maximum sampling time of forty hours. If the sampling time is less than two hours, then the dosimeter may be recapped after the exposure is over and uncapped during another identical or similar surgical procedure. This should allow you to get a total of two or more hours of sampling.

c. If a two hour sample cannot be provided, Landauer can perform an analysis of samples with as little as 9 ppm-hours mass concentration. The lowest detectable mass concentration is a value established by Landauer, which has a nonlinear response to various sampling times. The sensitivity of the dosimeters decreases when a shorter sampling time is used.

d. The Landauer badge program is a services contract. If you need extra badges, you must contact Landauer directly.

2. **LIMIT OF DETECTION**

Limit of Detection for the Landauer Nitrous Oxide Dosimeter

Exposure Time (hrs)	Lowest Detectable Mass Concentration (PPM-hours)	Calculated TWA For Exposure (PPM-TWA)
0.5	9	18
1.0	9	9
1.5	9	6
2.0	10	5
2.5	10	4
3.0	10	3
3.5	10	3
4.0	10	3
4.5	10	2
5.0	11	2

Note: The lowest detectable mass (loading rate) in column 2, is a "nonlinear value", established by the Landauer Company, based on sampling time.

To calculate the minimum concentration which can be detected for a sample you would look at the sampling time and the corresponding lowest detectable mass. Then you divide the lowest detectable mass by the exposure time.

EXAMPLE: A surgical procedure is sampled that lasts only 30 minutes (0.5 hours). Looking at the chart the lowest detectable mass is 9 ppm-hours. So the lowest detectable mass of 9 is divided by 0.5 hours. This gives you the result of 18 ppm-TWA, which is the calculated exposure for this sample.

Note: If the detectable mass is less than 9 ppm - TWA, the results will be reported as ND by Landauer.

3. **RETURNING THE DOSIMETERS**

Landauer dosimeters should be sent directly to the manufacturer and not to Armstrong Laboratory.

Landauer Analytical Laboratory
R.S. Landauer J. and Co.
Division of Tech/Ops, Inc
2 Science Road
Glenwood, IL 60425-1586
(312) 755-7000

4. **RESULTS INTERPRETATION**

a. Landauer reports three pieces of information for each dosimeter: the hours uncapped (which is the sampling time); ppm-hours (which is the mass of nitrous oxide collected on the dosimeter); and TWA (which is the average concentration during the time sampled, i.e. [ppm-hours]/[the hours uncapped]).

b. To calculate an 8-hour TWA for a personal sample:

1) If the individual was exposed to nitrous oxide only during the time sampled and there was no exposure during the rest of the 8-hour shift, the 8-hour TWA is simply [ppm-hours]/8.

2) If the time sampled does not cover the entire exposure for the day, then you must assume the exposure for the rest of the day is equal to that during the time sampled. In this case, the 8-hour TWA is the same as the TWA reported by Landauer.

Sampling for Particulates

The term "nuisance dusts" refers to substances that have a history of little adverse health or toxic effects. However, these materials are not biologically inert. The term now used by ACGIH is "particulates not otherwise classified" (PNOC). The reason for this change is to emphasize the fact that these materials are not harmless and that all material is potentially toxic in the right concentration. [The TLV-TWA set by ACGIH for PNOC is 10 mg/m^3]. ACGIH also has substance specific respirable fraction TLVs. OSHA has a generic PEL for respirable fraction of nuisance particulates of 5 mg/m^3.

A. Sampling:

1. **Inhalable or Total Particulates**: NIOSH Method 0500
Calibrate each personal sampling pump with a representative tared (pre-weighed) 37-mm, 5-um PVC filter in line. Sample at 1.5 to 2 liters/min. Do not exceed a total filter loading of approximately 2 mg total dust. Sample "close face" by removing only the plug.

2. **Respirable Particulates**: NIOSH Method 0600
Calibrate each personal sampling pump with a 10-mm Dorr-Oliver cyclone plus a tared 5-um PVC filter in line. The sampling rate should be 1.7 liters/min. (Note: Some manufacturers recommend a different sampling rate for their cyclone, so refer to the manufacturer's information for the precise sampling rate.) The sampling time can be from 45 minutes to 8 hours. Do not exceed 5 mg dust loading on the filter. Also, do not allow the sampler assembly to be inverted at any time. Turning the cyclone to anything more than a horizontal orientation may deposit over-sized material from the cyclone body onto the filter.

Note: Unless you sample for 7 out of 8 hours of the shift, then the sample is considered a screening sample, not a compliance sample.

B. Fibers:

1. Determine if talc, graphite, fibers, mica, soapstone or coal dust contain asbestos or asbestos-like fibers or crystalline silica before taking air samples. This may be done by contacting the manufacturer, consulting the MSDS, or submitting a bulk sample for analysis.

   a. If the substance contains asbestos, use the asbestos OEL and asbestos sampling method.

   b. If the substance contains greater than 1% crystalline silica, or if coal dust contains greater than 5% crystalline silica, use the silica, crystalline sampling method, and the silica OEL.

   c. If the dust is free of these contaminants, use the OEL for Particulates Not Otherwise Classified (PNOC).

Note: For dust having significant fibers content, sample with the cassette "open face" (example: fiberglass insultation).

Sampling with Passive Dosimeters

1. Passive dosimeters are not normally recommended for sampling the workplace environment. Only a few compounds have experimentally verified sampling rates; the remainder have theoretical, calculated sampling rates. Armstrong Laboratory recommends that passive dosimeters be used only in those cases when the primary method listed in this guide cannot be used. Below are factors to consider when using passive dosimeters.

   a. Concentration: Levels are seldom constant throughout the day. Dosimeters must be able to collect representative data despite these fluctuations. When the concentration drops to a very low level, the dosimeter must be capable of retaining the sample it has already collected.

   b. Humidity: High humidity can reduce absorptive capacity of a sampler's sorbent.

   c. Wind velocity: Since the dosimeter collects its sample through molecular diffusion, it must be designed to eliminate sample uptake due to wind velocity.

   d. Interfering Compounds: They can alter linear uptake and can displace the chemical hazard of interest from the sorbent.

   e. Storage: Over a period of time a partial or complete loss of sample can occur.

   f. Temperature: Adsorption onto the sorbent decreases with increasing temperature.

   g. Time: Knowing the minimum and maximum time a dosimeter can accurately sample it critical.

2. When the Bioenvironmental Engineer has determined passive dosimetry is appropriate, follow the manufacturer's instructions for proper use of their dosimeter. The following is a partial list of passive dosimeters available and the compounds suitable for measurement by the monitor.

   a. 3M Organic Vapor Monitors #3500/3510. Designed to measure average concentrations over a measured time interval of 8 hours or less. Refer to manufacturer instructions for specific chemicals that can be analyzed. Only 3 chemicals can be analyzed off of one monitor.

   b. 3M Formaldehyde Monitor #3720/3721. Designed to measure the time weighted average concentration of formaldehyde gas.

   c. 3M Ethylene Oxide Monitor. Designed to measure exposure to ethylene oxide. Badges can be used for short term exposure as well as 8 hour sampling.

   d. SKC Model 575-001 (Charcoal Sorbent). Designed to measure short term exposure for certain chemicals and average concentrations of up to 8 hours for all chemicals. This can be used for the following chemicals:

Vinylidene Chloride	Methylene Chloride
cis-1,2 Dichloroethylene	Chloroform
Methyl Chloroform	Carbon Tetrachloride
Ethylene Dichloride	Trichloroethylene
Proplyene Dichloride	1,1,2-Trichloroethane
Tetrachloroethylene	1,2,3-Trichloropropane
Pentane	Hexane
Cyclohexane	Heptane
Methyl cyclohexane	Octane
Nonane	Benzene
Toluene	Ethyl Benzene
Xylene, ortho	Xylene, meta

Xylene, para	Cumene
p-Tert Butyl Toluene	

e. SKC Model 575-002 (Anasorb[R] 747 Sorbent). Designed to measure short term exposure for certain chemicals and average concentrations of up to 8 hours for all chemicals. This can be used for the following chemicals:

Acetone	Methyle Ethyl Ketone
Methyl Isobutyl Ketone	Diisobutyl Ketone
2-Pentanone	2-Hexanone
Methyl Acrylate	Methyl Methacrylate
Butyl Acrylate	

f. SKC Model 575-003 (Anasorb[R] 727 Sorbent). Designed to measure the average concentration of up to 8 hours for Cyclohexanone.

3. For those monitors that do not have a code under collection method, use "PX" for those monitors. For the number designation use 100, but call Armstrong Laboratory/OEA (DSN 240-3626) to see which chemicals can be analyzed off the same monitor.

Petroleum Distillate Solvents/Fuels

1. Petroleum distillate solvent and fuels are normally analyzed by NIOSH method 1550, and reported out as Petroleum Distillates (mg/m^3) as n-hexane. These are generally mixtures of many hydrocarbons (as many as 300) whose composition will vary with each lot or source. Hexane is used to calibrate the analytical instruments for this analysis and will give a close approximation of the actual concentration of vapors in the air.

2. In the event a hazardous component, such as benzene, is recognized it will be reported separately.

3. Typical names that fall in this category include: Stoddard Solvent, PD-680, mineral spirits, naphtha, etc.

4. The true fuels (i.e., JP-4, mogas) will also be treated in a similar manner unless a bulk sample of the specific fuel in use is submitted as a standard. If you do not submit a specific sample of the solvent in use, then request "VM & P NAPHTHAS", Petroleum Distillates, for the analysis.

Polychlorinated Biphenyls (PCB), Dioxin (PCDD, TCDD), Furans (PCDF) Sampling

1. PCB Sampling

a. Air Sampling: Use NIOSH Method 5503 to determine the ambient air concentration of PCBs. This method consists of a 13 mm glass fiber filter followed by a solid sorbent tube containing 150 mg Florisil, with 50 mg as a backup. The sampling rate is 0.05 to 0.2 liter/min for a sample volume of 1 to 50 liters. The sample filters should be transfered to glass vials after sampling. The working range for this method is 0.01 to 100 mg/m^3 for a 40 liter air sample.

b. Swipe Sampling: Wipe surfaces which are representative of the contamination zone. Swipe samples should represent a 100 square centimeter area (10cm x 10cm). Collect samples using a 3" by 3" precleaned cotton gauze pad wetted with 8 ml of hexane. Areas to be wiped should be marked with a template and wiped in a nondirectional pattern in at least two directions at 90 degrees to one another. When sending the sample to the laboratory, you need to send 2 ml of hexane as a blank sample.

2. PCB Sampling After a Fire or Electrical Overheat Condition: After a fire involving PCBs or a mixture of PCBs and chlorinated benzenes, three types of samples should be collected to determine the extent of the contamination and the effectiveness of the cleanup. The three types are as follows:

a. Soot Sampling: Soot is typically a black, friable, carbonaceous material. Collect 50 to 100 grams of soot in an amber glass container with a Teflon lined cap. This sample can be used to determine the ratio of PCBs to polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) formed.

b. Swipe Sampling: Swipe samples of surface representative of the contamination zones. Collect both PCB swipe samples for PCDD/TCDD/PCDFs. Swipe samples should represent a 0.25 square meter area (50cm x 50cm). Use the method as described above for PCB swipe sampling.

c. Air Sampling: Use NIOSH Method 5503 for ambient sampling of PCBs. Air Samples for PCDD, TCDD and PCDF should be collected using a two stage high volume air sampling device. To obtain this device, contact Armstrong Laboratory, Technical Operations at DSN 240-3626.

Solid Sorbent Tube Sampling

1. The number codes following the term CT, SG, TX, etc., under the collection method indicate a specific analysis technique (i.e., CT-101, CT-104, etc.). When sampling for more than one chemical, only those with the same number may be collected on the same tube. Chemicals with different number codes must be collected on separate tubes.

2. High humidity and other atmospheric conditions, and other vapors present may affect the collection efficiency of the tube for a particular analyte. Try to avoid sampling under extreme conditions. If this is not possible, advise the laboratory and make a notation of the circumstances surrounding the sampling.

3. For blanks, break the tips in the field, cap the blank tube immediately, and ship with the exposed samples.

4. When using two tubes in series, disconnect the tubes after sampling to prevent migration.

Sampling for Welding Fumes

Welding Fumes cannot be classified simply. The composition and quantity of both are dependent on the alloy being welded and the process and electrodes used. Reliable analysis of fumes cannot be made without considering the nature of the welding process and system being examined; reactive metals and alloys such as aluminum and titanium are arc-welded in a protective, inert atmosphere such as argon. These arcs create relatively little fume, but they do create an intense radiation which can produce ozone. Similar processes are used to arc-weld steels, also creating a relatively low level of fumes. Ferrous alloys also are arc-welded in oxidizing environments that generate considerable fume and can produce carbon monoxide instead of ozone. Such fumes generally are composed of discreet particles of amoprhous slags containing iron, manganese, silicon, and other metallic constituents depending on the alloy system involved. Chromium and nickel compounds are found in fumes when stainless steels are arc-welded. Some coated and flux-cored electrodes are formulated with fluorides and the fumes associated with them can contain significantly more fluorides than oxides. Because of the above factors, arc-welding fumes frequently must be tested for individual constituents that are likely to be present to determine whether specific TLVs are exceeded. Conclusions based on total fume concentration are generally adequate if no toxic elements are present in welding rod, metal, or metal coating and conditions are not conductive to the formation of toxic gases.

There is no single analytical method for accurately determining a number of different metals from a single air sample. Each metal has different physical and chemical properties and they differ in the method required for their analysis. Many metals fall into general groups with similar characteristics and it is possible to analyze for more than one metal from a single sample, providing the metals are in the same group.

The basic groups are as follows

WELD1 chromium, copper, iron, manganese, nickel, zinc
WELD2 antimony, cadmium, lead, silver, tin
WELD3 aluminum, beryllium, cobalt, molybdenum, titanium
WELD4 arsenic, mercury, selenium
WELD5 calcium, magnesium, potassium, sodium and others not listed above

The metals commonly encountered in welding or metal working operations with mild or stainless steel are generally in group 1.

If analysis for metals in a different group is required, a seperate sample for each group should be submitted.

If you are interested in only 1 or 2 metals and not the entire group, **THEN PLEASE REQUEST ONLY THOSE METALS INDIVIDUALLY.**

INDUSTRIAL HYGIENE AIR SAMPLING DATA	OEHL Use		

Mail Samples To: ______________________

ARMSTRONG LABORATORY

Occupational & Environmental Health Directorate
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

☐ ROUTINE ☐ PRIORITY *(pre-arrange with analyst)* ☐ CHAIN OF CUSTODY	AUTHORIZATION NUMBER:
	Sampling Site Identifer
DATE/TIME COLLECTED: ____ YY / MM / DD 24 HR	BASE WHERE SAMPLE COLLECTED
	SAMPLE SITE DESCRIPTION (BLDG,NUMBER/LOCATION/AREA)
DATE/TIME RECEIVED: ____ YY / MM / DD 24 HR	SAMPLE COLLECTED BY (NAME, GRADE, AFSC)
	SIGNATURE / DSN

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*	
ORIGINAL	
COPY 1	
COPY 2	

Reason Submitted: (F3 For Selection) E	Store at ____ °C	Armstrong Lab PID: *(AL Use Only)*

Manufacturer & Lot#:

ARMSTRONG LAB SAMPLE NUMBER:				
BASE SAMPLE NUMBER:				
Collection Media Code: *(One per sampling form)*				
A	Analyte			
	CAS Nbr.			
B	Analyte			
	CAS Nbr.			
C	Analyte			
	CAS Nbr.			
D	Analyte			
	CAS Nbr.			
E	Analyte			
	CAS Nbr.			
Vol. Sampled (L)				
Pump/Dosimeter #				

Description *(Name, NSN, Mil-Spec,etc.)*

☐ Supporting Bulk Sample Included ☐ MSDS Attached

REMARKS:

AF Form 2750

INDUSTRIAL HYGIENE AIR SAMPLE COLLECTION AND CALIBRATION WORKSHEET

WORKPLACE/SITE IDENTIFIER: ______ Employee Sampled: ☐ Typical Worker ☐ Most At Risk

EMPLOYEE NAME and SSN: ______

BUILDING NUMBER/LOCATION: ______ ROOM/AREA: ______

COLLECTED BY: ______ DATE: ___ ___ ___

CALIBRATION	Pre-Survey	Pump Voltage Checked? ☐	Post-Survey	
Calibration Method				
Manufacturer & Serial #				
Pump Manufac & Serial #	A	B	A	B
Flow Rate L/min				
cc/min				
Rep. Sampler In Line?	☐ *(Y / N)*	☐ *(Y / N)*	☐ *(Y / N)*	☐ *(Y / N)*
Calibrated By				
Where Calbrated				
Date/Time				
Temperature/Pressure	/		/	

VOLUME SAMPLED *(Include volume correction if applicable)*

	CONTAMINANT	CAS Number	OEL Number	Type	Source/Year	UCL *(from reverse)*
A						
B						
C						
D						
E						

BASE SAMPLE NUMBER:

	A	B	C
Sampling Train	Pump A	Pump A	Pump A
	B Code:	B Code:	B Code:
Time *(Off/On)*	/	/	/
Collection Time *(min)*			
Volume Sampled *(L)*			

Temperature: ______ °C Unusual Conditions: Extended Workday ______ hours

Humidity > 90% ______ Other: ______

Pressure: ______ Wind ______ ft/sec ______

REMARKS:

AF FORM 2750A

CALCULATIONS

SAMPLING NOTES Task performed hrs/day, days/month

Sampling Media Source, Catalog #, Lot #:

Describe significant events at time of occurence; Emergency controls, ventilation, repirators and PPE (were they used, were they used properly, etc.); was the observed task consistent with AF Forms 2755, 2758 & 2761?

Sample #	Time	Conc.	Comments/Operation Description

TWA Calculations $TWA = \dfrac{(C_1 T_1) + (C_2 T_2) + (C_3 T_3) + \ldots\ldots (C_n T_n)}{T_1 + T_2 + T_3 \ldots\ldots T_n}$

Two or More Chemicals with the same target organ: (Compare to Mixture OEL of 1) $\dfrac{TWA1}{STD_1} + \dfrac{TWA2}{STD_2} + \ldots \dfrac{TWAn}{STD\ n}$

STATISTICAL CALCULATION
(See Instructions for definition)

If TWA > AL, $UCL = TWA + \dfrac{SAE * OEL}{\sqrt{n}}$

If TWA < AL, $UCL = TWA + \dfrac{SAE * AL}{\sqrt{n}}$

Completed By: Date:

INTERPRETATION *(Check One)*

TWA > OEL - Exposure exceeds OEL - Implement appropriate controls.

UCL > OEL - Possible overexposure ; Use professional judgement and collect additional samples to support final exposure classification.

UCL < OEL , but UCL > AL - Implement appropriate surveillance and/or training programs and collect additional samples to support final exposure classification.

UCL < AL - No overexposure; No further air monitoring required unless task changes

INSTRUCTIONS FOR COMPLETING AF FORM 2750A
INDUSTRIAL HYGIENE SAMPLING DATA

The purpose of this form is to record industrial air sampling information. This form can be used for samples submitted to AL/OEA or for local gravimetric determinations. Perform Pro provides pull down menus to help fill out the analysis section of the form (ie F3)

1. Routine, Priority, or Chain of Custody. Select type of sample. Priorities must be pre-arranged with the lab. If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

2. Date/Time collected. Enter date sample collected (for example, if Jan 14, 1994, enter 94/01/14). Samples cannot be logged in/analyzed unless a collection date specified. Use the 24 hour clock.

3. Mail Reports To: Enter mailing address where the analytical reports are to be sent. It is the same code we use for TLDs. The letter Z is the fifth character that identifies Bioenvironmental Engineering (mailing symbol SGPB). If you have not received the 5 character code, call Sample Control DSN 240-3626 (commercial (512) 536-3626. If additional copies of the report are required enter the proper address in the space provided following the Original Block.

4. Reason for Submission. Enter code (in the box to the right of shaded "E") indicating reason for submitting sample. If using Perform Pro Filler program, enter F3 function key to bring up table for selection.

Reason	Codes
Accident/Incident	A
Routine/Periodic	R
Complaint	C
Follow/Cleanup	F
Other	O

5. Storage Temperature. Storage temperature in degrees Centigrade.

6. Authorization Number. Call Customer Service at DSN 240-3626 for number.

7. Sampling Site Identifier. Enter code for sampling site identifier. Samples cannot be logged in without a valid sampling site identifier.

8. Base. Enter name of base where workplace is located.

9. Sample Site Description. Enter name of workplace. Enter building number or location. Enter specific part of workplace being sampled (for example, Room 26, degreaser, lay up table).

10. Sample Collected By. Enter name (last name only), grade and AFSC of individual collecting sample.

11. Signature. Enter signature of individual collecting sample.

12. DSN. Enter DSN number of responsible individual who can answer questions form the laboratory concerning the sample.

13. Manufacturer & Lot#. Manufacturer and lot# of sampling media.

14. Sample Collection Data. Data can be entered in this section for a maximum of three samples. Five analyses per sample may be requested. Use additional pages if more than three samples were taken at the same workplace.

a. Base Sample Number. Enter eight-digit coded base sample number for each sample.

b. Collecting Media. Enter seven-digit code describing sample media. Use codes provided in the Recommended Sampling Methods (Table) for each compound (for example, for Dimethylamine, extra SGXX-113).

c. Analyses Requested. Enter name and CAS number for each (maximum of five) analysis requested. CAS numbers are provided in the Recommended Sampling Methods next to each compound name (for example, for Dimethylamine, enter 124403).

d. Volume Sampled. Enter volume sampled in liters (L). This equals the average flow rate times the total collection time (L/Min X Min). This is the uncorrected volume. Sample results from the AL/OEA will not automatically be corrected for normal industrial hygiene conditions.

e. Pump or Monitor Number. Enter serial number if pump was used. If passive dosimeter was used, enter number found on back of dosimeter (monitor).

15. Description (Name, NSN, Mil-Spec, etc.) Descriptionof chemical being sampled.

16. Supporting Bulk Sample Included. Check block if included. If using Perform Pro Filler program, check block by hitting the “X” key.

17. MSDS Attached. Check block if included. If using Perform Pro Filler program, check block by hitting the "X" key.

18. Remarks. Identify any known or suspected substances present during sampling which might affect the laboratory's analysis, and record any additional information which the laboratory may need (ie special handling and storage instructions). Include name of any laboratory personnel consulted on sampling strategy.

19. Submit original form with sample(s) being analyzed.

20. The following fields are for Armstrong Lab only:

a) Date/Time Received. Leave Blank.

b) Armstrong Lab PID. Leave Blank.

c) Armstrong Lab Sample Number. Leave blank.

21. Fill additional Industrial Hygiene Air Sample Collection and Calibration worksheet for samples. Keep last two pages of form for case files (do not send calibration sheets to AL/OEA).

INSTRUCTIONS FOR COMPLETING AF FORM 2750B, INDUSTRIAL HYGIENE AIR SAMPLE COLLECTION AND CALIBRATION WORKSHEET

The purpose of this form is to record data and document exposure calculations for industrial hygiene air samples. This form is to be used regardless of whether the samples are to be analyzed by the Armstrong Laboratory Analytical Services Division (AL/OEA), or by another analysis laboratory. Refer to the Armstrong Laboratory Occupational and Environmental Health (AL/OE) Laboratory Services Guide before sampling for aid in developing an effective sampling strategy for the workplace.

A separate form will be used for each employee sampled. The form allows for up to two pumps/sampling trains to be used at the same time on one employee, and for the workday to be divided up into as many as four sampling periods. If not enough space is provided for unusual sampling situations, additional information should be recorded on a separate sheet of paper and stapled to this form.

This form is for local retention only and should not be sent to AL/OEA or any other analysis laboratory.

1. Workplace Identifier. This code consists of the 4-digit base code, 4-digit organization and work function code and a 4-digit case file/activity/task code.

2. Organization/Location. Enter name and location of organization where task is performed as a memory jogger of the meaning of the workplace identifier code.

3. Employee Sampled. Enter the full name of the employee on which the sampling train is placed, and indicate if the employee is representative of the typical worker in the workplace, or is likely to be the most at-risk to an overexposure.

4. Calibration. This section provides space for the pre-survey and post-survey calibration of the air sampling pump used in the sampling train. In the case where two sampling trains are to be placed on the same worker, space is provided for the calibration of two pumps (or a single pump with a flowsplitter). If a passive dosimeter is the sampler, this section can be skipped.

a. Calibration Method. Enter the type of method used to calibrate the pump. If an electronic bubble tube calibrator is used, enter the manufacturer name and serial number.

b. Pump Manufacturer. Enter the manufacturer name and serial number of the pump to be used in the sampling train. During the pre-survey calibration, indicate if the pump battery voltage has been checked. If a second sampling train is used, enter information in column B.

c. Flow Rate. Enter the average of three or more consecutive flow rate determinations in the appropriate block and check whether this is in Liters/min or cc/min.

d. Representative Sampler in Line. All NIOSH and OSHA validated methods require the calibration of pumps with a representative sampling train in place between the pump and the calibrating device, to reduce sampling error. If the purpose of sampling is for ascertaining compliance with an Occupational Exposure Limit (OEL), then calibrate using a representative sampler in line and check the YES box. If sampling is performed for screening purposes only, then checking the NO box is acceptable.

e. Calibrated by. Enter the name of the individual who calibrated the pump. Local policy may require a signature.

f. Where Calibrated, Date, Time of Day, Temperature/Pressure. Enter appropriate information for recordkeeping purposes.

5. Sampling Notes. This space is provided to record pertinent information about the specific operation or task observed during sampling. Space is available to record the frequency of the task, the sampling train(s) placed on the employee, significant events that occurred during sampling, and any controls used during this specific sampling period. This space should not be used as a substitute for the workplace narrative (AF Form 2755), description of potential hazards (AF Form 2758), or hazardous materials data (AF Form 2761), but this space is a place to record any observations that are inconsistent with the data on these forms.

6. Contaminant Sampled. Enter the names of chemicals to be analyzed and their Chemical Abstract Series (CAS) numbers in the table. CAS numbers can be found in the AL/OE Laboratory Services Guide, in the Hazardous Materials Information System (HMIS) published by the Department of Defense, in Dangerous Properties of Industrial Materials by Sax and Lewis, or in other common references. Space is provided for up to five chemicals that can be analyzed on one or two sampling trains. The chemical name and CAS number will be copied over to the AF Form 2750A if the sample is to be sent to AL/OEA for analysis. For each chemical listed in the table, enter the most current and restrictive OEL, the type of limit (8-hour TWA, STEL, or Ceiling Limit), and the source and year of the limit (OSHA PEL, ACGIH TLV, NIOSH REL, Manufacturer REL, etc.). The preferred units for the OEL are mg/m^3, because correction for

differences in temperature and pressure from Normal Temperature and Pressure (NTP) (25°C and 760 mm Hg barometric pressure) is not necessary, whereas correction is required for significant deviations from NTP when ppm units are used. When calculations on the reverse are completed, enter the upper confidence limit (UCL) in the space provided.

7. Base Sample Number. Enter 6-digit number as described on page 307. This information will be copied over to the AF Form 2750A if the sample is to be sent to AL/OEA for analysis.

8. Sampling Train. Circle the pump used for each sample, and enter the appropriate collection media code as provided in the AL/OE Laboratory Services Guide. Enter 2 digit code of sampling media if only one sampler in series is required. Enter 4 digit code if two samplers in series is required. For example, use CT for toluene analysis, or MFMB for dinitrobenzene analysis.

9. Time Off/On. Record the time the pump or dosimeter began collecting a sample and the time sampling was complete.

10. Collection Time. Enter total collection time in minutes by carefully subtracting on and off times and converting the hours to minutes.

11. Volume Sampled. Enter the volume sampled in liters, from the calculation on the back side of this form (see instruction 13 below). This information will be copied over to the AF Form 2750A if the sample is to be sent to AL/OEA for analysis.

12. Sampling Accomplished By. In this block, record the name or signature of the individual collecting the sample, the date collected, the temperature and barometric pressure at the sampling site, and any unusual conditions that may affect sample collection.

13. Calculations. On the back side of the AF Form 2750B is provided space for performing calculations.

a. Volume Sampled. In most cases this will simply be the calibrated flow rate in L/min, multiplied by the sampling time in minutes. If a density-dependent calibration device such as a rotameter is used, the volume must be corrected by using the following calculation:

Install Equation Editor and double-
click here to view equation.

where the Temperature (T) is in absolute units (°K = °C + 273, or °R = °F + 460), and the Pressure (P) is in any suitable units (atm,mm Hg, etc.) In the case of

passive dosimeters, the "flow rate" to be used is determined by the manufacturer of the dosimeter. The AL/OE Laboratory Services Guide lists the "flow rates" of most passive dosimeters.

b. TWA Calculation. When results are received, calculate the time-weighted average (TWA) exposure of the employee in this space, following the examples in the AL/OE Laboratory Services Guide. If more than one chemical has the same target organ, calculate the mixture OEL also.

c. Statistical Calculation. If the calculated TWA is greater than the OEL, then no statistical calculation is required and one should move down to the Interpretation block. If the calculated TWA is greater than the action level (AL), calculate an Upper Confidence Limit (UCL) using the OEL, the Sampling and Analytical Error (SAE), and the number of samples used in the TWA calculation (n) as shown. If the calculated TWA is less than the AL, calculate an UCL using the AL in place of the OEL. Examples of these calculations are provided in the AL/OE Laboratory Services Guide. When calculations are complete, sign and date the form in the space provided, and transfer the UCLs to the front side of the 2750B.

d. Interpretation. Check the appropriate box and take the appropriate action indicated.

14. File a copy of the form in Tab D of the appropriate case file, with analytical results stapled to it.

INDUSTRIAL HYGIENE AIR SAMPLING DATA

OEHL Use

Mail Samples To:

ARMSTRONG LABORATORY

Occupational & Environmental Health Directorate
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

- [x] ROUTINE
- [ ] PRIORITY *(pre-arrange with analyst)*
- [ ] CHAIN OF CUSTODY

AUTHORIZATION NUMBER: 950123 45

Sampling Site Identifer	0	2	5	5	A	X	X				X	X	8	A

BASE WHERE SAMPLE COLLECTED: NEWARK AFB

SAMPLE SITE DESCRIPTION (BLDG NUMBER/LOCATION/AREA): BERYLLIUM RM BLDG 4

SAMPLE COLLECTED BY (NAME, GRADE, AFSC): SMITH, AMN.

SIGNATURE:

DSN: 555-8040

DATE/TIME COLLECTED: 95/08/18 15:50 (YY / MM / DD, 24 HR)

DATE/TIME RECEIVED: (YY / MM / DD, 24 HR)

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*

ORIGINAL	0 2 5 5 A	AGMC\MAEL(5) NEWARK AFB OH 43057
COPY 1	0 2 5 5 O	AFMC\SGB NEWARK AFB OH 43057-0005
COPY 2		

Reason Submitted: (F3 For Selection) E R

Store at 25 °C

Armstrong Lab PID: *(AL Use Only)*

Manufacturer & Lot#:

ARMSTRONG LAB SAMPLE NUMBER:				
BASE SAMPLE NUMBER:		*EZ950123*	*EZ950124*	*BK950001*
Collection Media Code: *(One per sampling form)*		T F A 2 4 7	T F A 2 4 7	T F A 2 4 7
A	Analyte	BERYLLIUM	BERYLLIUM	BERYLLIUM
	CAS Nbr.	7440417	7440417	7440417
B	Analyte			
	CAS Nbr.			
C	Analyte			
	CAS Nbr.			
D	Analyte			
	CAS Nbr.			
E	Analyte			
	CAS Nbr.			
Vol. Sampled (L)		8.66 liters	12.23 liters	
Pump/Dosimeter #		7	3	

Description *(Name, NSN, Mil-Spec, etc.)*

- [ ] Supporting Bulk Sample Included
- [ ] MSDS Attached

REMARKS:

AF Form 2750

BULK/COMMERCIAL PRODUCT SAMPLING DATA	OEHL USE ONLY		

Mail Samples To:

ARMSTRONG LABORATORY
Occupational & Environmental Health Directorate
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

- [ ] ROUTINE
- [ ] PRIORITY *(pre-arrange with analyst)*
- [ ] CHAIN OF CUSTODY

AUTHORIZATION NUMBER:

SAMPLING SITE IDENTIFER

BASE WHERE SAMPLE COLLECTED

DATE/TIME COLLECTED:

SAMPLE SITE DESCRIPTION (BLDG. NUMBER/LOCATION/AREA)

DATE/TIME RECEIVED:

SOURCE BEING SAMPLED

SAMPLE COLLECTED BY (NAME, GRADE, AFSC)

EXISTING CONTROLS (Personal protective equipment,Engineering Admin.)

SIGNATURE | DSN

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*	
	ORIGINAL
	COPY 1
	COPY 2

REASON SUBMITTED: (F3 FOR SELECTION) E

Armstrong Lab PID: *(AL Use Only)*

ARMSTRONG LAB SAMPLE NUMBER:				
SE SAMPLE NUMBER:				
A	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
B	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
C	MethodAnalyte F3 FOR SELECTION			
	CAS Nbr.			
D	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
E	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
Material Name				
Lot #				
NSN *(FSN)*				
Spec *(Mil or Fed)*				
Manufacturer				
Description of Material ge and Nearby Industrial Processes				

REMARKS:

AF FORM 2751

INSTRUCTIONS FOR COMPLETING AF FORM 2751
BULK MATERIAL SAMPLING DATA

The purpose of this form is to request bulk material, compressed gas, LOX analyses, bulk asbestos, PCB, or hazardous waste analyses from AL/OEA. Major chemical components, specific components, or Hazardous/Toxic waste characteristic can also be requested. Perform Pro provides pull down menus to help fill out the analysis section of the form.

1. Routine, Priority, Chain of Custody. Indicate type of sample. Priority sample must be pre-arranged with the lab. If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

2. Date/Time Collected. Enter date sample collected (for example, if Jan. 14, 1994, enter 94/01/14). Samples cannot be logged in/analyzed unless a collection date is specified. Use the 24 hour clock.

3. Sample Collected By. Enter name (last name only), grade and AFSC of individual collecting sample.

4. Signature. Enter signature of individual collecting sample.

5. DSN. Enter DSN number of responsible individual who can answer questions from the laboratory concerning the sample.

6. Authorization Number. Call Laboratory Customer Service at DSN 240-3626 for number. For use with Environmental Lab Cooperative (ELC), primarily hazardous waste samples pre-arranged with AL/OEA.

7. Sampling Site Identifier. Enter code for sampling site identifier. Samples cannot be logged in without a valid sampling site identifier.

8. Base. Enter name of base where workplace is located.

9. Sample Site Description. Enter name of workplace. Enter building number or location. Enter specific part of workplace being sampled (for example, Room 26, degreaser, lay up table).

10. Source Being Sampled. Enter description of source being sampled (for example, slop tank, deteriorated ceiling) and the nature of the operation/task being performed.

11. Existing Controls. Enter controls in use at time of survey, including observations as to their effectiveness.

12. Mail Reports To: Enter the mailing address where the analytical reports are to be sent. It is the same code we use for TLDs. The letter Z is the fifth character that identifies Bioenvironmental Engineering (mailing symbol SGPB). If you have not received the 5 character code, call Sample Control DSN 240-3626 (commercial (512) 536-3626). If additional copies of the report are required enter the proper address in the space provided following the Original Block.

13. Reason for Submission. Enter code (in the box to the right of shaded "E") indicating reason for submitting sample. If using Perform Pro Filler program enter F3 function key to bring up table for selection.

Reason	Codes
Accident/Incident	A
Routine/Periodic	R
Complaint	C
Follow-up/Cleanup	F
Other	O

14. Sample Collection Data. Analyses can be requested in this section for a maximum of three samples. Five analyses per sample may be requested.

A. Base Sample Number. Enter eight-digit coded base sample number for each sample.

B. Analyses requested. Enter "major components" if chemical composition is requested. Enter name and CAS Number if analyses of specific components are requested. CAS numbers are provided in the Recommended Sampling Methods (Table) next to each compound name (for example, for Dimethylamine, enter 124403). If using the Perform Pro filler program enter F3 function key to bring up table of methods available. Select one.

c. Material Name. Enter name as it appears on the container.

D. Lot Number. Enter manufacturer's lot number.

E. NSN (FSN). Enter national (or federal) stock number of material.

F. Specification (MIL or FED). Enter military or federal specification number.

G. Manufacturer's Name. Enter complete name, address and telephone number (if available) of the material manufacturer.

H. Description of Material Usage. Describe how the material is used in the workplace. For wastes, describe how they are stored.

I. Remarks. Record any additional information, which the laboratory may need or any additional analyses required. Also, include the name of any laboratory personnel consulted on sampling strategy.

15. Submit original form with sample(s) being analyzed.

16. The following fields are for Armstrong Lab only:

A. Date/Time Received. Leave Blank.

B. Armstrong Lab PID. Leave Blank

C. Armstrong Lab Sample Number. Leave Blank.

BULK/COMMERCIAL PRODUCT SAMPLING DATA

OEHL USE ONLY

Mail Samples To:

ARMSTRONG LABORATORY

Occupational & Environmental Health Directorate
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

- [x] ROUTINE
- [ ] PRIORITY *(pre-arrange with analyst)*
- [ ] CHAIN OF CUSTODY

AUTHORIZATION NUMBER: 9 5 0 1 2 3 4 5

SAMPLING SITE IDENTIFER: 0 2 5 3 Q F A X X [redacted] 0 0 1 A

DATE/TIME COLLECTED: 94/09/27 07:00 AM

DATE/TIME RECEIVED:

BASE WHERE SAMPLE COLLECTED: BROOKS AFB

SAMPLE SITE DESCRIPTION (BLDG. NUMBER/LOCATION/AREA): BLDG 140 RM 88

SOURCE BEING SAMPLED: CEILING TILE OVER DESK

SAMPLE COLLECTED BY (NAME, GRADE, AFSC): SMITH AMN. 1110

SIGNATURE

DSN: 240-3626

EXISTING CONTROLS (Personal protective equipment,Engineering Admin.): GLOVES, MASK

MAIL REPORTS TO: (USE ASSIGNED BASE CODE)

ORIGINAL	0	2	5	3	P	SPGH/BROOKS AFB
COPY 1						
COPY 2						

REASON SUBMITTED: (F3 FOR SELECTION) E C

Armstrong Lab PID: *(AL Use Only)*

ARMSTRONG LAB SAMPLE NUMBER:				
BASE SAMPLE NUMBER:		* G M 9 4 0 1 2 3 *	* G T 9 4 0 1 2 3 *	* G C 9 4 0 1 2 3 *
A	Method/Analyte F3 FOR SELECTION	PCB (8080)	Hazardous/Toxic Waste	TCLP :FULL (1311)
	CAS Nbr.			
B	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
C	MethodAnalyte F3 FOR SELECTION			
	CAS Nbr.			
D	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
E	Method/Analyte F3 FOR SELECTION			
	CAS Nbr.			
Material Name				
Lot #				
NSN *(FSN)*				
Spec *(Mil or Fed)*				
Manufacturer				
Description of Material Usage and Nearby Industrial Processes				

REMARKS: PLEASE E-MAIL RESULTS.

AF FORM 2751

INORGANICS ANALYSIS REQUEST FORM	OEHL USE ONLY:		

Mail Samples To: ***ARMSTRONG LABORATORY***

Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 FOR SELECTION) E	IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? System Name: System Number:	No

DATE/TIME COLLECTED:	AUTHORIZATION NUMBER:
DATE/TIME RECEIVED BY LAB:	
DATE ANALYSIS COMPLETED:	SAMPLING SITE IDENTIFIER
ON-SITE ANALYTICAL RESULTS	
WATER TEMPERATURE °C / pH units / COLLECTION METHOD ☐ GRAB ☐ COMPOSITE	BASE WHERE SAMPLE COLLECTED
HOW WAS THE SAMPLE PRESERVED? ☐ None: Grp G Only ☐ H_2SO_4:Grps A-C,E ☐ NaOH:Grp D Only ☐ Zinc Acetate:Grp J Only	SAMPLING SITE DESCRIPTION (BLDG. NUMBER/LOCATION/WELL #)
SAMPLE LOCATION: ☐ Source ☐ Pt of Entry ☐ Distribution ☐ Other:	SAMPLE COLLECTED BY (NAME, GRADE, AFSC)
WATER TREATMENT: ☐ Raw ☐ Chlorination ☐ Fluoridation ☐ Other:	SIGNATURE / DSN

MAIL REPORTS TO (CIRCLE IF CHANGED)		
	ORIGINAL	
	COPY 1	
	COPY 2	

BASE SAMPLE NUMBER		OEHL PID (AL/OEA USE ONLY)	

PARAMETER			PARAMETER	
GROUP A			**GROUP G**	
Chemical Oxygen Demand	mg/L		Acidity, Total	mg/L
Organic Carbon	mg/L		Alkalinity, Total	mg/L
			Alkalinity, Bicarbonate	mg/L
GROUP B			Bromide	mg/L
Oil & Grease	mg/L		Carbon Dioxide	mg/L
TPH	mg/L		Chloride	mg/L
			Color	Units
GROUP C			Fluoride	mg/L
Ammonia	mg/L		Residue, Total	mg/L
Kjeldahl Nitrogen	mg/L		Residue, Filterable (TDS)	mg/L
Nitrate	mg/L		Residue, Nonfilterable	mg/L
Nitrite	mg/L		Residue, Settleable	mg/L
Orthophosphate	mg/L		Residue, Volatile	mg/L
Phosphorus, Total	mg/L		Silica	mg/L
			Specific Conductance	Umhos
GROUP D			Sulfate	mg/L
Cyanide, Total	mg/L		Surfactans-MBAS	mg/L
Cyanide, Free	mg/L		Turbidity	Units
			Langlier Index	
GROUP E			PH	Units
Phenols	ug/L		**GROUP J**	
			Sulfides	mg/L

REMARKS:	
	CHEMIST:
	REVIEWED BY:
AF FORM 2752A	APPROVED BY:

INSTRUCTIONS FOR COMPLETING AF FORM 2752A
INORGANICS SAMPLING DATA

The purpose of this form is to request inorganics analyses from the AL/OEA.

1. Reason for Submission. Enter code (in the box to the right of shaded "E") indicating reason for submitting sample. If using Perform Pro Filler program, enter F3 function key to bring up table for selection.

Reason	Codes
Accident/Incident	A
Routine/Periodic	R
Complaince	C
NPDES	N
Followup/Cleanup	F
Other	O

2. Sample for State Drinking Water Compliance. Yes or No. If using Perform Pro Filler program just click mouse on field for response. If Yes enter the following fields:
   a) System Name.
   b) System Number.

3. Date/Time Collected. Enter date sample collected (for example, if Jan. 14, 1994, enter 94/01/14). Samples cannot be logged in/analyzed unless a collection date is specified. Use 24 hour clock

4. Water Temperature. Degrees Centigrade.

5. Ph. Units.

6. Collection Method. Select one of the following:
   a) Grab
   b) Composite.
   If using Perform Pro Filler program select correct entry by hitting the "X" key to check block.

7. How was the sample preserved? Select one or more of the following:
   a) None, group G only
   b) Sulfuric acid, groups A, B, C & E
   c) Sodium hydroxide, group D only
   d) Zinc Acetate, group J only
   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

8. Sample Location. Select one or more of the following:
   a) Source
   b) Point of entry
   c) Distribution
   d) Other; if other is selected enter sample location in blank.
   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

9. Water Treatment. Select one or more of the following:
   a) Raw
   b) Chlorination
   c) Fluoridation
   d) Other; if other is selected enter Water Treatment in blank.
   If using Perform Pro Filler program select correct entry by hitting the "X" key to check block.

10. Authorization Number. Call Customer Service at DSN 240-3626 for number. Foruse with Environmental Lab Cooperative (ELC), primarily for hazardous waste samples.

11. Sampling Site Identifier. Enter code for sampling site identifier. Samples cannot be logged in without a valid sampling site identifier.

12. Base. Enter name of base where workplace is located.

13. Sample Site Description. Enter name of workplace. Enter building number or location. Enter specific part of workplace being sampled (for example, Room 26, degreaser, lay up table).

14. Sample Collected By. Enter name (last name only), grade and AFSC of individual collecting sample.

15. Signature. Enter signature of individual collecting sample.

16. DSN. Enter DSN number of responsible individual who can answer questions from the laboratory concerning the sample.

17. Mail Reports To: Enter the mailing address where the analytical reports are to be sent. It is the same code we use for TLDs. The letter Z is the fifth character that identifies Bioenvironmental Engineering (mailing symbol SGPB). If you have not received the 5 character code, call Sample Control AV 240-3626 (commercial (512) 536-3626). If additional copies of the report are required enter the proper address in the space provide following the Original Block.

18. Sample Collection Data. Analyses can be requested in this section for a maximum of one sample.

a. Base Sample Number. Enter eight-digit coded base sample number for each sample.

b. Analyses requested. Check off individual analyses listed. If using Perform Pro Filler program, select entry(ies) by hitting "X" key to check block(s).

c. Remarks. Record any additional information which the laboratory may need, Or any additional analyses required. Also include name of any laboratory personnel consulted on sampling strategy.

19. Submit original form with sample(s) being analyzed.

20. The following fields are for Armstrong Lab only:

a) Date/Time Received. Leave Blank.

b) Date Analysis completed. Leave Blank.

c) Armstrong Lab PID. Leave Blank.

d) Armstrong Lab Sample Numbers. Leave Blank.

INORGANICS ANALYSIS REQUEST FORM	OEHL USE ONLY:		

Mail Samples To: ____________________ **_ARMSTRONG LABORATORY_**

Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 FOR SELECTION)	E N	IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? System Name: System Number:	No

DATE/TIME COLLECTED:	94/09/27 12:00 PM	AUTHORIZATION NUMBER:	* 9 5 0 1 2 3 4 5 *
DATE/TIME RECEIVED BY LAB:			
DATE ANALYSIS COMPLETED:		SAMPLING SITE IDENTIFIER	0 0 9 3 Z [redacted]

ON-SITE ANALYTICAL RESULTS

WATER TEMPERATURE 5 °C	pH 1.00 units	COLLECTION METHOD ☑ GRAB ☐ COMPOSITE	BASE WHERE SAMPLE COLLECTED KEESLER AFB
HOW WAS THE SAMPLE PRESERVED? ☑ None: Grp G Only ☐ H_2SO_4:Grps A-C,E ☐ NaOH:Grp D Only ☐ Zinc Acetate:Grp J Only			SAMPLING SITE DESCRIPTION (BLDG. NUMBER/LOCATION/WELL #) 81 MDG WARD 2A ICU-TAPWATER RM 11B
SAMPLE LOCATION: ☐ Source ☐ Pt of Entry ☑ Distribution ☐ Other: ________			SAMPLE COLLECTED BY (NAME, GRADE, AFSC) JOHNSON AMN
WATER TREATMENT: ☐ Raw ☐ Chlorination ☑ Fluoridation ☐ Other: ________			SIGNATURE / DSN 555-6545

MAIL REPORTS TO (CIRCLE IF CHANGED)							
	ORIGINAL	0	0	9	3	Z	81 MDG/SGPD, 301 FISHER ST, STE 107, KEESLER AFB
	COPY 1						
	COPY 2						

BASE SAMPLE NUMBER	* G P 9 4 0 1 2 3 *	OEHL PID (AL/OEA USE ONLY)

	PARAMETER				PARAMETER	
	GROUP A				GROUP G	
	Chemical Oxygen Demand	mg/L			Acidity, Total	mg/L
✓	Organic Carbon	mg/L		✓	Alkalinity, Total	mg/L
					Alkalinity, Bicarbonate	mg/L
	GROUP B				Bromide	mg/L
✓	Oil & Grease	mg/L			Carbon Dioxide	mg/L
	TPH	mg/L			Chloride	mg/L
					Color	Units
	GROUP C				Fluoride	mg/L
	Ammonia	mg/L			Residue, Total	mg/L
	Kjeldahl Nitrogen	mg/L			Residue, Filterable (TDS)	mg/L
✓	Nitrate	mg/L			Residue, Nonfiliterable	mg/L
	Nitrite	mg/L			Residue, Settleable	mg/L
	Orthophosphate	mg/L			Residue, Volatile	mg/L
	Phosphorus, Total	mg/L			Silica	mg/L
					Specific Conductance	Umhos
	GROUP D				Sulfate	mg/L
	Cyanide, Total	mg/L			Surfactans-MBAS	mg/L
	Cyanide, Free	mg/L			Turbidity	Units
					Langlier Index	
	GROUP E				PH	Units
	Phenols	ug/L			GROUP J	
					Sulfides	mg/L

REMARKS: PLEASE FAX RESULTS.	CHEMIST:
	REVIEWED BY:
AF FORM 2752A	APPROVED BY:

ORGANICS ANALYSIS REQUEST FORM	**OEHL Use Only:**

Mail Samples To:

ARMSTRONG LABORATORY
Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 for Selection)	E	IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? System Name: ______ System Number: ______	No

DATE/TIME COLLECTED: ______ YY / MM / DD ______ 24 Hr

DATE/TIME RECEIVED: ______ YY / MM / DD ______ 24 Hr

AUTHORIZATION NUMBER:

SAMPLING SITE IDENTIFER

SAMPLE LOCATION: ☐ SOURCE ☐ PT OF ENTRY ☐ DISTRIBUTION ☐ OTHER: ______

BASE WHERE SAMPLE COLLECTED

WATER TREATMENT: ☐ RAW ☐ CHLORINATION ☐ FLUORIDATION ☐ OTHER: ______

SAMPLE SITE DESCRIPTION (BLDG, NUMBER/LOCATION/AREA)

HOW WAS THE SAMPLE PRESERVED? ☐ UNPRESERVED ☐ SULFURIC ACID ☐ SODIUM HYDROXIDE ☐ NITRIC ACID ☐ SODIUM THIOSULFATE ☐ HYDROCHLORIC ACID

SAMPLE COLLECTED BY (NAME, GRADE, AFSC)

COLLECTION METHOD ☐ GRAB ☐ COMPOSITE

SIGNATURE | DSN

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*

ORIGINAL
COPY 1
COPY 2

ARMSTRONG LAB SAMPLE NUMBER

Armstrong Lab PID: *(AL Use Only)*

BASE SAMPLE NUMBER:

EPA Method: (F3 for Selection) ______

Contaminants	Contaminants	Contaminants
1	21	41
2	22	42
3	23	43
4	24	44
5	25	45
6	26	46
7	27	47
8	28	48
9	29	49
10	30	50
11	31	51
12	32	52
13	33	53
14	34	54
15	35	55
16	36	56
17	37	57
18	38	58
19	39	59
20	40	60

REMARKS:

AF FORM 2752B

INSTRUCTIONS FOR COMPLETING AF FORM 2752B
ORGANICS SAMPLING DATA

The purpose of this form is to request organic analyses from the AL/OEA. Perfrom Pro provides pull down menus to help fill out the analysis section of the form.

1. Reason for Submission. Enter code (in the box to the right of shaded "E") indicating reason for submitting sample. If using Perform Pro Filler program, enter F3 the function key to bring up a selection table.

Reason	Codes
Accident/Incident	A
Routine/Periodic	R
Complaince	C
NPDES	N
Followup/Cleanup	F
Other	O

2. Sample for State Drinking Water Compliance. Yes or No. If using Perform Pro Filler program just click mouse on field for response. If Yes enter the following fields:
   a) System Name.
   b) System Number.

3. Date/Time Collected. Enter date sample collected (for example, if Jan. 14, 1994, enter 94/01/14). Samples will not be logged in or analyzed unless a collection date is specified. Use 24 hour clock.

4. Sample Location. Select one of the following:
   a) Source
   b) Point of entry
   c) Distribution
   d) Other; if other is selected enter sample location in blank. If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

5. Water Treatment. Select one of the following:
   a) Raw
   b) Chlorination
   c) Fluoridation
   d) Other; if other is selected enter sample location in blank.
   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

6. How was the sample preserved? Select one of the following:
   a) Sulfuric acid
   b) Sodium Hydroxide
   c) Nitric Acid
   d) Sodium Thiosulfate
   e) Hydrochloric Acid
   f) Unpreserved

   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

7. Collection Method. Select one of the following:
   a) Grab
   b) Composite.

   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

8. Authorization Number. Call Customer Service at DSN 240-3626 for number. For use with Environmental Lab Cooperative (ELC), primarily for hazardous waste samples pre-arranged with AL/OEA.

9. Sampling Site Identifier. Enter code for sampling site identifier. Samples cannot be logged in without a valid sampling site identifier.

10. Base. Enter name of base where workplace is located.

11. Sample Site Description. Enter name of workplace. Enter building number or location. Enter specific part of workplace being sampled (for example, Bldg. 107, Room 26, degreaser, lay up table).

12. Sample Collected By. Enter name (last name only), grade and AFSC of individual collecting sample.

13. Signature. Enter signature of individual collecting sample.

14. DSN. Enter DSN number of responsible individual who can answer questions from the laboratory concerning the sample.

15. Mail Reports To: Enter the mailing address where the analytical reports are to be sent. It is the same code we use for TLDs. The letter Z is the fifth character that identifies Bioenvironmental Engineering (mailing symbol SGPB). If you have not received the 5 character code, call Sample Control AV 240-3626 (commercial (512) 536-3626). If additional copies of the report are required enter the proper address in the space provide following the Original Block.

16. Sample Collection Data. Analyses can be requested in this section for a maximum of one sample.

a. Base Sample Number. Enter eight-digit coded base sample number for sample.

b. EPA method requested. Enter EPA method or list individual analyses requested. If using the Perform Pro Filler program, enter F3 function key to bring up table to methods available. Select one.

c. Remarks. Record any additional information that the laboratory may need or any additional analyses required. Also, include name of any laboratory personnel consulted on sampling strategy.

17. Submit original form with sample(s) being analyzed.

18. The following fields are for Armstrong Lab only:

a) Date/Time Received. Leave Blank.

b) Armstrong Lab PID. Leave Blank.

c) Armstrong Lab Sample Number. Leave Blank.

ORGANICS ANALYSIS REQUEST FORM

OEHL Use Only:

Mail Samples To:

ARMSTRONG LABORATORY

Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 for Selection) E R

IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? Yes

System Name: TEXAS **System Number:** 0123456789

DATE/TIME COLLECTED: 99\08\01 (YY / MM / DD) 09:45 (24 Hr)

DATE/TIME RECEIVED: ______ (YY / MM / DD) ______ (24 Hr)

AUTHORIZATION NUMBER: 9 5 0 1 2 3 4 5

SAMPLING SITE IDENTIFER: 2 5 3 Q F A X X 1 [redacted] 2 3 V B

SAMPLE LOCATION: ☑ SOURCE ☐ PT OF ENTRY ☐ DISTRIBUTION ☐ OTHER: ______

WATER TREATMENT: ☑ RAW ☐ CHLORINATION ☐ FLUORIDATION ☐ OTHER: ______

HOW WAS THE SAMPLE PRESERVED? ☐ UNPRESERVED ☐ SULFURIC ACID ☐ SODIUM HYDROXIDE ☐ NITRIC ACID ☑ SODIUM THIOSULFATE ☑ HYDROCHLORIC ACID

COLLECTION METHOD ☐ GRAB ☑ COMPOSITE

BASE WHERE SAMPLE COLLECTED: BLDG 714 BAR FAUCET

SAMPLE SITE DESCRIPTION (BLDG, NUMBER/LOCATION/AREA): JOHN DOE AMN.

SAMPLE COLLECTED BY (NAME, GRADE, AFSC): 240-3626

SIGNATURE: DSN 240-3626

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*

ORIGINAL	2	5	3	Q	O	OEAQ\BROOKS AFB
COPY 1						
COPY 2						

ARMSTRONG LAB SAMPLE NUMBER: Armstrong Lab PID: *(AL Use Only)*

BASE SAMPLE NUMBER: *GP950001*

EPA Method: (F3 for Selection) 524.2

Contaminants		Contaminants		Contaminants	
		Purgeable Organics			
1	Bromodichloromethane	21	1,1,1-Trichlorethane	41	m-Dichlorobenzene
2	Bromoform	22	1,1,2-Trichloroethane	42	Dichlorodifluoromethane
3	Chloroform	23	Trichloroethene	43	1,1-Dichloroethane
4	Chlorodibromomethane	24	Vinyl Chloide	44	1,3-Dichloropropane
5	Benzene	25	o-Xylene	45	2,2-Dichloropropane
6	Carbon Tetrachloride	26	m-Xylene	46	1,1-Dichloropropene
7	Chlorobenzene	27	p-Xylene	47	cis-1,3-Dichloropropene
8	o-Dichlorobenzene	28	Bromobenzene	48	trans-1,3-Dichloropropen
9	p-Dichlorobenzene	29	Bromochloromethane	49	Hexchlorobutadiene
10	1,2-Dichloroethane	30	Bromomethane	50	Isopropyltoluene
11	1,1-Dichloroethene	31	n-Butylbenzene	51	p-Isopropyltoluene
12	cis-1,2-Dichloroethene	32	Sec-Butylbenzene	52	Naphthalene
13	trans-1,2-Dichloroethene	33	Tert-Butylbenzene	53	n-Propylbenzene
14	Dichloromethane	34	Chloroethane	54	1,1,1,2-Tetrachloroethan
15	1,2-Dichloromethane	35	Chloromethane	55	1,1,2,2-Tetrachloroethan
16	Ethylbenzene	36	o-Chlorotoluene	56	1,2,3-Trichlorobenzene
17	Styrene	37	p-Chlorotoluene	57	Trichlorofluoromethane
18	Tetrachloroethene	38	Dibromochlorpropane	58	1,2,3-Trichloropropane
19	Toluene	39	1,2-Dibromoethane	59	1,2,4-Trimethylbenzene
20	1,2,4-Trichlorobenzene	40	Dibromomethane	60	1,3,5-Trimethylbenzene

REMARKS:

ORGANICS ANALYSIS REQUEST FORM

OEHL Use Only:

Mail Samples To: ______________________

ARMSTRONG LABORATORY
Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 for Selection): E R	IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? **Yes** — System Name: TEXAS — System Number: 0123456789
DATE/TIME COLLECTED: 99\08\01 (YY / MM / DD) 09:45 (24 Hr)	AUTHORIZATION NUMBER: 9 5 0 1 2 3 4 5
DATE/TIME RECEIVED: ______ (YY / MM / DD) ______ (24 Hr)	SAMPLING SITE IDENTIFER: 2 5 3 Q F A X X 1 [redacted] 2 3 V B
SAMPLE LOCATION: ☑ SOURCE ☐ PT OF ENTRY ☐ DISTRIBUTION ☐ OTHER: ______	BASE WHERE SAMPLE COLLECTED: BLDG 714 BAR FAUCET
WATER TREATMENT: ☑ RAW ☐ CHLORINATION ☐ FLUORIDATION ☐ OTHER: ______	SAMPLE SITE DESCRIPTION (BLDG, NUMBER/LOCATION/AREA): JOHN DOE AMN.
HOW WAS THE SAMPLE PRESERVED? ☐ UNPRESERVED ☐ SULFURIC ACID ☐ SODIUM HYDROXIDE ☐ NITRIC ACID ☑ SODIUM THIOSULFATE ☑ HYDROCHLORIC ACID	SAMPLE COLLECTED BY (NAME, GRADE, AFSC): 240-3626
COLLECTION METHOD ☐ GRAB ☑ COMPOSITE	SIGNATURE: — DSN: 240-3626

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*							
	ORIGINAL	2	5	3	Q	O	OEAQ\BROOKS AFB
	COPY 1						
	COPY 2						

ARMSTRONG LAB SAMPLE NUMBER	Armstrong Lab PID: *(AL Use Only)*
BASE SAMPLE NUMBER: *GP950001*	**EPA Method:** (F3 for Selection) 608

Contaminants		Contaminants		Contaminants	
		Organochlorine Pesticid.			
1	Aldrin	21	Arochlor 1232	41	
2	alpha-BHC	22	Arochlor 1242	42	
3	beta-BHC	23	Arochlor 1248	43	
4	delta-BHC	24	Arochlor 1254	44	
5	Chlordane	25	Arochlor 1260	45	
6	4,4'-DDD	26		46	
7	4,4'-DDE	27		47	
8	4,4'-DDT	28		48	
9	Dieldrin	29		49	
10	EndoSulfan I	30		50	
11	EndoSulfan II	31		51	
12	EndoSulfan sulfate	32		52	
13	Endrin	33		53	
14	Endrin aldehyde	34		54	
15	Heptachlor	35		55	
16	Heptachlor Epoxide	36		56	
17	Lindane (gamma-BHC)	37		57	
18	Toxaphene	38		58	
19	Arochlor 1016	39		59	
20	Arochlor 1221	40		60	

REMARKS:

ORGANICS ANALYSIS REQUEST FORM

OEHL Use Only:

Mail Samples To:

ARMSTRONG LABORATORY
Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 for Selection) E R	IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? Yes **System Name:** TEXAS **System Number:** 0123456789
DATE/TIME COLLECTED: 99\08\01 (YY / MM / DD) 09:45 (24 Hr) DATE/TIME RECEIVED: (YY / MM / DD) (24 Hr)	AUTHORIZATION NUMBER: 9 5 0 1 2 3 4 5
SAMPLE LOCATION: ☑ SOURCE ☐ PT OF ENTRY ☐ DISTRIBUTION ☐ OTHER:	SAMPLING SITE IDENTIFER: 2 5 3 Q F A X X 1 [redacted] 2 3 V B
	BASE WHERE SAMPLE COLLECTED: BLDG 714 BAR FAUCET
WATER TREATMENT: ☑ RAW ☐ CHLORINATION ☐ FLUORIDATION ☐ OTHER:	SAMPLE SITE DESCRIPTION (BLDG, NUMBER/LOCATION/AREA): JOHN DOE AMN.
HOW WAS THE SAMPLE PRESERVED? ☐ UNPRESERVED ☐ SULFURIC ACID ☐ SODIUM HYDROXIDE ☐ NITRIC ACID ☑ SODIUM THIOSULFATE ☑ HYDROCHLORIC ACID	SAMPLE COLLECTED BY (NAME, GRADE, AFSC): 240-3626
COLLECTION METHOD ☐ GRAB ☑ COMPOSITE	SIGNATURE — DSN 240-3626

MAIL REPORTS TO: *(USE ASSIGNED BASE CODE)*						
ORIGINAL	2	5	3	Q	O	OEAQ\BROOKS AFB
COPY 1						
COPY 2						

ARMSTRONG LAB SAMPLE NUMBER		Armstrong Lab PID: *(AL Use Only)*	
SE SAMPLE NUMBER:	* G P 9 5 0 0 0 1 *	**EPA Method:** (F3 for Selection)	505

Contaminants		Contaminants		Contaminants
		Organohalide/Pest's/PCB'		
1	Alachlor	21	Aroclor 1232	41
2	Aldrin	22	Aroclor 1242	42
3	Atrazine	23	Aroclor 1248	43
4	Chlordane	24	Aroclor 1254	44
5	alpha-Chlorodane	25	Aroclor 1260	45
6	gamma-Chlorodane	26		46
7	Dieldrin	27		47
8	Endrin	28		48
9	Heptachlor	29		49
10	Heptachlor Epoxide	30		50
11	Hexachlorobenzene	31		51
12	Hexachlorocyclopentadien	32		52
13	Lindane	33		53
14	Methoxychlor	34		54
15	cis-Nonachlor	35		55
16	trans-Nonachlor	36		56
17	Simazine	37		57
18	Toxaphene	38		58
9	Aroclor 1016	39		59
20	Aroclor 1221	40		60

REMARKS:

AF FORM 2752B

METALS ANALYSIS REQUEST FORM (GROUP F)

OEHL USE ONLY:

Mail Samples To:

ARMSTRONG LABORATORY

Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED (F3 FOR SELECTION) E

IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? No

System Name: System Number:

DATE/TIME COLLECTED:

DATE/TIME RECEIVED BY LAB:

DATE ANALYSIS COMPLETED:

AUTHORIZATION NUMBER:

SAMPLING SITE IDENTIFIER

ON-SITE ANALYTICAL RESULTS

COLLECTION METHOD ☐ GRAB ☐ COMPOSITE

BASE WHERE SAMPLE COLLECTED

HOW WAS THE SAMPLE PRESERVED?
☐ Nitric Acid ☐ None:Chromium, Hexavalent Only (24 hrs HT)

SAMPLING SITE DESCRIPTION (BLDG. NUMBER/LOCATION/WELL #)

SAMPLE LOCATION:
☐ Source ☐ Pt of Entry ☐ Distribution ☐ Other:

SAMPLE COLLECTED BY (NAME, GRADE, AFSC)

WATER TREATMENT:
☐ Raw ☐ Chlorination ☐ Fluoridation ☐ Other:

SIGNATURE

DSN

MAIL REPORTS TO (CIRCLE IF CHANGED)

ORIGINAL

COPY 1

COPY 2

BASE SAMPLE NUMBER

OEHL PID (AL/OEA USE ONLY)

PARAMETER GROUP F		ADDITIONALLY FOR WASTE WATER METALS CHOOSE FROM THE FOLLOWING SET OF ANAYLYTES	
Antimony	mg/L	Aluminum	mg/L
Arsenic	mg/L	Boron	mg/L
Barium	mg/L	Calcium	mg/L
Beryllium	mg/L	Cobalt	mg/L
Cadmium	mg/L	Iron	mg/L
Chromium	mg/L	Magnesium	mg/L
Chromium, hexavalent	mg/L	Manganese	mg/L
Copper	mg/L	Molybdenium	mg/L
Lead	mg/L	Potassium	mg/L
Mercury	mg/L	Silver	mg/L
Nickel	mg/L	Vanadium	mg/L
Selenium	mg/L	Zinc	mg/L
Sodium	mg/L		
Thallium	mg/L		
	mg/L		
	mg/L		

REMARKS:

CHEMIST:

REVIEWED BY:

APPROVED BY:

AF FORM 2752C

INSTRUCTIONS FOR COMPLETING AF FORM 2752C
METAL WATER SAMPLING DATA

The purpose of this form is to request metal analyses from AL/OEA. Perform Pro provides pull down menus to help fill out the form.

1. Reason for Submission. Enter code (in the box to the right of shaded "E") indicating reason for submitting sample. If using Perform Pro Filler program, enter F3 function key to bring up table for selection.

Reason	Codes
Accident/Incident	A
Routine/Periodic	R
Complaince	C
NPDES	N
Followup/Cleanup	F
Other	O

2. Sample for State Drinking Water Compliance. Yes or No. If using Perform Pro Filler program, just click mouse on field for response. If yes enter the following fields:
   a) System Name.
   b) System Number.

3. Date/Time Collected. Enter date sample collected (for example, if Jan. 14, 1994, enter 94/01/14). Samples cannot be logged in/analyzed unless a collection date is specified. Use 24 hour clock.

4. Collection Method. Select one of the following:
   a) Grab
   b) Composite
   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

5. How was the sample preserved? Select one of the following:
   a) Nitric Acid
   b) None for Chromium Hexavlent Only, which has a holding time of 24 hours.
   If using Perform Pro Filler program, select correct entry by hitting the "X" key to check block.

6. Sample Location. Select one of the following:
   a) Source
   b) Point of entry
   c) Distribution

d) Other; if other is selected enter sample location in blank. If using Perform Pro Filler program select correct entry by hitting the "X" key to check block.

7. Water Treatment. Select one of the following:
   a) Raw
   b) Chlorination
   c) Fluoridation
   d) Other; if other is selected enter Water Treatment in blank. If using Perform Pro Filler program select correct entry by hitting the "X" key to check block.

8. Authorization Number. Call Customer Service at DSN 240-3626 for number. For use with Environmental Lab Cooperative (ELC), primarily for hazardous waste samples pre-arranged with AL/OEA.

9. Sampling Site Identifier. Enter code for sampling site identifier. Samples cannot be logged in without a valid sampling site identifier.

10. Base. Enter name of base where workplace is located.

11. Sample Site Description. Enter name of workplace. Enter building number or location. Enter specific part of workplace being sampled (for example, Bldg. 107, Room 26, degreaser, lay up table).

12. Sample Collected By. Enter name (last name only), grade and AFSC of individual collecting sample.

13. Signature. Enter signature of individual collecting sample.

14. DSN. Enter DSN number of responsible individual who can answer questions from the laboratory concerning the sample.

15. Mail Reports To: Enter the mailing address where the analytical reports are to be sent. It is the same code we use for TLDs. The letter Z is the fifth character that identifies Bioenvironmental Engineering (mailing symbol SGPB). If you have not received the 5 character code, call Sample Control AV 240-3626 (commercial (512) 536-3626). If additional copies of the report are required enter the proper address in the space provided following the Original Block.

16. Sample Collection Data. Analyses can be requested in this section for a maximum of one sample.

   a. Base Sample Number. Enter eight-digit coded base sample number for each sample..

b. Analyses requested. Check off individual metals listed. If using Perform Pro Filler program select entry(ies) by hitting the "X" key to check block(s).

c. Remarks. Record any additional information which the laboratory may need or any additional analyses required. Also, include name of any laboratory personnel consulted on sampling strategy.

17. Submit original form with sample(s) being analyzed.

18. The following fields are for Armstrong Lab only:

a) Date/Time Received. Leave Blank.

b) Date Analysis completed. Leave Blank.

c) Armstrong Lab PID. Leave blank.

d) Armstrong Lab Sample Number. Leave blank.

METALS ANALYSIS REQUEST FORM (GROUP F)

OEHL USE ONLY:

Mail Samples To: ***ARMSTRONG LABORATORY***
Occupational & Environmental Health Directorate/OEA
2402 E. Drive, Bldg 140
Brooks AFB, Texas 78235-5114
(210) 536-3626 DSN: 240-3626

REASON SUBMITTED **(F3 FOR SELECTION)** E C

IS SAMPLE FOR STATE DRINKING WATER COMPLIANCE UNDER PHASE II to V of the FSDWA? No
System Name: System Number:

DATE/TIME COLLECTED: 95/08/30 10:00 AM
DATE/TIME RECEIVED BY LAB:
DATE ANALYSIS COMPLETED:
ON-SITE ANALYTICAL RESULTS

AUTHORIZATION NUMBER: 9 5 0 1 2 3 4 5

SAMPLING SITE IDENTIFIER: 0 0 9 3 Z

COLLECTION METHOD ☑ GRAB ☐ COMPOSITE

BASE WHERE SAMPLE COLLECTED: KEESLER AFB

HOW WAS THE SAMPLE PRESERVED?
☑ Nitric Acid ☐ None:Chromium, Hexavalent Only (24 hrs HT)

SAMPLING SITE DESCRIPTION (BLDG. NUMBER/LOCATION/WELL #): 81 MDG WARD 2A ICU-TAPWATER ROOM 11B

SAMPLE LOCATION:
☐ Source ☐ Pt of Entry ☑ Distribution ☐ Other:

SAMPLE COLLECTED BY (NAME, GRADE, AFSC): SMITH, AMN

WATER TREATMENT:
☐ Raw ☐ Chlorination ☑ Fluoridation ☐ Other:

SIGNATURE | DSN 555-6545

MAIL REPORTS TO (CIRCLE IF CHANGED)							
	ORIGINAL	0	0	9	3	Z	81 MDG/SGPB 301 FISHER ST, STE 107, KEESLER AFB
	COPY 1						
	COPY 2						

BASE SAMPLE NUMBER: *GP9401 23*

OEHL PID (AL/OEA USE ONLY)

	PARAMETER GROUP F			ADDITIONALLY FOR WASTE WATER METALS CHOOSE FROM THE FOLLOWING SET OF ANAYLYTES	
	Antimony	mg/L		Aluminum	mg/L
	Arsenic	mg/L		Boron	mg/L
	Barium	mg/L		Calcium	mg/L
	Beryllium	mg/L		Cobalt	mg/L
	Cadmium	mg/L		Iron	mg/L
	Chromium	mg/L		Magnesium	mg/L
	Chromium, hexavalent	mg/L		Manganese	mg/L
✓	Copper	mg/L		Molybdenum	mg/L
✓	Lead	mg/L		Potassium	mg/L
	Mercury	mg/L		Silver	mg/L
	Nickel	mg/L		Vanadium	mg/L
	Selenium	mg/L		Zinc	mg/L
	Sodium	mg/L			
	Thallium	mg/L			
		mg/L			
		mg/L			

REMARKS:
PLEASE FAX RESULTS.

CHEMIST:
REVIEWED BY:
APPROVED BY:

AF FORM 2752C

RADIOLOGICAL SAMPLING FORM

PRIVACY ACT STATEMENT

AUTHORITY: 10 U.S.C 8013; Executive Order 9397.
PURPOSE: To collect information required to accurately assess dose due to radiation exposure and for entry of this information into the Air Force Master Radiation Exposure Registry (MRER) as required by 10 CFR 20.
ROUTINE USES: This information may be disclosed to the NRC for regulatory purposes.
DISCLOSURE IS VOLUNTARY: However, failure to provide the requested information will result in failure to accurately assess and post doses per 10 CFR 20.

PART 1 - ENVIRONMENTAL RADIOLOGICAL SAMPLES

MAIL SAMPLES TO: **AL/OEBA** **2402 E DRIVE** **BROOKS AFB, TX 78235-5114**	WORKPLACE OR SITE	
	BASE	ORGANIZATION
	WORKPLACE OR SITE	
	BUILDING NO./LOCATION	ROOM/AREA

DATE COLLECTION BEGAN *(YY MM DD)*	TIME COLLECTION BEGAN *(24 HOUR CLOCK)*	DATE COLLECTION ENDED *(YY MM DD)*	TIME COLLECTION ENDED *(24 HOUR CLOCK)*

MAIL REPORTS TO *(USE ASSIGNED BASE CODE)*	ORIGINAL	
	COPY 1	
	COPY 2	

SAMPLE COLLECTED BY *(Name/Grade/AFSC)*	SIGNATURE	DSN NO.

RADIOLOGICAL SAMPLING DATA

REASON SUBMITTED *(Select one)*	A - ACCIDENT/INCIDENT	I - RCRA	N - NPDES
	E - EPA COMPLIANCE	K - RAMP	O - OTHER *(Specify)*
	F - FOLLOWUP/CLEANUP	C - COMPLAINT	

BASE SAMPLE NUMBER

COLLECTION METHOD *(Enter letter code)*

C - COMPOSTE
G - GRAB
O - OTHER

SAMPLE TYPE *(Enter letter code)*

X - AIR AMBIENT/GEN AREA	D - RESIDUE/ASH
Y - AIR EMISSION, SOURCE	L - SLUDGE
K - CHARCOAL CANISTER	S - SOIL
F - FOODSTUFFS	V - VEGETATION
G - GAS/AIR, COMPRESSED	T - WASTE, HAZARDOUS, TOXIC
M - INDUSTRIAL MATERIAL	N - WATER, NONPOTABLE
O - OTHER	P - WATER, POTABLE, NOT SDWA

ANALYSIS REQUESTED *(Specify radionuclides)*

AIR FILTER DATA

VOLUME COLLECTED ______________________ CUBIC METERS (M^3)

CERTIFICATION STATEMENT *"Based on my understanding of the origin of this sample and/or the process which generated it, I certify that to the best of my knowledge this sample contains no characteristic or listed wastes as defined by 40CFR261" (If the sample does, tell us the nature of the hazardous material).*

NAME	SIGNATURE	DATE

COMMENTS

RADIOLOGICAL SAMPLING FORM *(Continued)*

PART 2 - BIOLOGICAL SAMPLES

MAIL SAMPLES TO:	WORKPLACE OR SITE	
AL/OEBA **2402 E DRIVE** **BROOKS AFB, TX 78235-5114**	BASE	ORGANIZATION
	WORKPLACE OR SITE	
	BUILDING NO./LOCATION	ROOM/AREA

DATE COLLECTION BEGAN *(YY MM DD)*	TIME COLLECTION BEGAN *(24 HOUR CLOCK)*	DATE COLLECTION ENDED *(YY MM DD)*	TIME COLLECTION ENDED *(24 HOUR CLOCK)*

MAIL REPORTS TO *(USE ASSIGNED BASE CODE)*	
	ORIGINAL
	COPY 1
	COPY 2

SAMPLE COLLECTED BY *(Name/Grade/AFSC)*	SIGNATURE	DSN NO.

RADIOLOGICAL SAMPLING DATA

REASON SUBMITTED *(Select one)*			
	A - ACCIDENT/INCIDENT	I - RCRA	N - NPDES
	E - EPA COMPLIANCE	K - RAMP	M- 10 CFR 20
	F - FOLLOWUP/CLEANUP	C - COMPLAINT	O - OTHER *(Specify)*

BASE SAMPLE NUMBER

COLLECTION METHOD *(Enter letter code)*

V - SINGLE VOID
T - 24 HOUR VOID
O - OTHER

SAMPLE TYPE *(Enter letter code)*

O - BIOASSAY/OTHER
B - BLOOD
E - BREATH SAMPLE
J - FECES
A - HAIR
H - HUMAN TISSUE/WBC
R - HASAL SWAB
U - URINE
Z - BREATHING ZONE AIR SAMPLE

ANALYSIS REQUESTED *(Specify radionuclides)*

SUBJECT NAME *(Last, first, middle initial)*	SSN

HEIGHT *(Inches)*	WEIGHT *(Pounds)*	DATE OF BIRTH *(YY MM DD)*	SEX		PREGNANT				ROUTE OF EXPOSURE			
				MALE		YES		N/A		INHALATION		INJECTION
				FEMALE		NO				INGESTION		ABSORPTION

ACUTE EXPOSURE DATA		CHRONIC EXPOSURE DATA	
DATE EXPOSURE *(YY MM DD)*	TIME EXPOSURE *(HHMM LT)*	DATE EXPOSURE *(YY MM DD)* START:	DATE EXPOSURE *(YY MM DD)* *STOP:*

NUCLIDE	INHALATION CLASS *(D, W, Y)*	CHEMICAL FORM AND PHYSICAL DESCRIPTION	PARTICLE SIZE *(IF KNOWN)*

COMMENTS

INSTRUCTIONS FOR COMPLETING AF FORM 2753, ENVIRONMENTAL AND BIOLOGICAL RADIOLOGICAL SAMPLING DATA

The purpose of this form is to record collection information for radiological samples. The form is to be used for samples submitted to Armstrong Laboratory, Occupational and Environmental Health Directorate, Bioenvironmental Engineering Division, Radioanalytical Branch (AL/OEBA). The front side (Part 1) of the 2753 is submitted for environmental samples while the reverse side (part 2) of the 2753 is used for biological samples. This form is now available on PerFORM PRO. Please see your local PDO. Do not use this form for submission of routine swipe samples; use AF Form 495, Swipe Container.

For environmental samples, the following describes the appropriate entries for the various fields on the AF Form 2753. If you are completing this form for biological samples, please use the guidance under part 2 of this section.

1. **PART 1 – AF Form 2753, ENVIRONMENTAL RADIOLOGICAL SAMPLES**

a. **Workplace or Site Identifier** -- Enter code for Workplace Identifier (if industrial sample) or Site Identifier (if environmental sample). These codes are shown in **Attachment III-A3-3.**

b. **Base** -- Enter name of base where workplace is located.

c. **Organization** -- Enter name of organization.

d. **Workplace or Site** -- Enter name of workplace or site.

e. **Building Number/Location** -- Enter building number or location.

f. **Room/Area** -- Enter specific part of workplace being sampled (e.g., Room 26, specimen handling table). If sample pertains to entire workplace, enter "NA" (not applicable).

g. **DATE COLLECTION BEGAN** -- Enter date sample collected or date sampling began (e.g., if Jan 14, 1994, enter 94/01/14).

h. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling began.

i. **DATE COLLECTION ENDED** -- Enter date sample collected or date sampling ended (e.g., if Jan 14, 1994, enter 94/01/14).

j. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling ended.

k. **MAIL REPORTS TO** --

I. Your Office or Organization

a. Enter the mailing code (base code) for your particular facility, consisting of an alphabetical prefix, a number, and a suffix. If you are unsure of your correct mailing code, please call us at DSN 240-2061/2062 or commercial (210) 536-2061/2062. Failure to provide the proper mailing code may cause your report to be misrouted or delayed in processing.

b. The alphabetical prefix indicates your command. It is assigned by AL/OEBA and is used for radiological samples only at this time.

c. Numeric code (up to five digits) assigned to your base by AL/OEBA. This code should be referenced in all correspondence with the AL/OEBA.

d. The alphabetical suffix indicates a particular mailing address on your base. It is assigned by AL/OEBA.

II. **Copies To:** You can enter up to two additional address codes for duplicate copies of the reports, and we will mail them directly to your intended recipients (your command BEE? The base Civil Engineer?) If you wish to do this, please call us prior to the first time, so that we can make sure your intended recipient is in our data base, and give you the correct address code to use.

l. **SAMPLE COLLECTED BY** -- Enter name (last name, first name, middle initial), grade, and AFSC of individual collecting sample.

m. **SIGNATURE** -- Enter signature of individual collecting the sample.

n. **DSN** -- Enter DSN number of responsible individual who can answer questions that may arise from the laboratory concerning the sample.

o. **REASON FOR SUBMISSION** -- Select and enter code (from the boxes to the right) indicating the reason for submission. If "other" is chosen, please specify the reason.

p. **Base Sample Number** -- Enter eight-digit coded base sample number (See Appendix A, page A-2).

q. **Analysis Requested** -- Specify the radionulides you need specific analysis for. If analysis by a specific mode is desired, please specify with a brief justification. For example, please analyze by alpha spectroscopy for ^{234}U, ^{235}U, ^{238}U to distinguish naturally occurring uranium from depleted uranium contaminant.

r. **Air Filter Data** -- Enter the volume of air collected on the air filter. Use cubic meters (M^3) if possible. If another unit of volume is used, please indicate the volumetric unit (i.e. cubic feet (ft^3)).

s. ***Read and Understand the certification statement! --*** The individual responsible for directing the sample collection must sign and date the 2753. If other hazardous materials could be present, please indicate in the comments section the nature and extent of the material. Samples with hazardous materials will be sent back to originators for disposal after analysis is completed. *We will also return samples to originators for disposal if the certification statement is not signed.*

2. **PART 2 -- AF Form 2753, BIOLOGICAL RADIOLOGICAL SAMPLES**

a. **Workplace or Site Identifier** -- Enter code for Workplace Identifier (if industrial sample) or Site Identifier (if environmental sample). These codes are shown in Attachment III-A3-3.

b. **Base** -- Enter name of base where workplace is located.

c. **Organization** -- Enter name of organization.

d. **Workplace or Site** -- Enter name of workplace or site.

e. **Building Number/Location** -- Enter building number or location.

f. **Room/Area** -- Enter specific part of workplace where individual being sampled primarily works (e.g., Room 26, specimen handling table). If the individual works in or covers the entire workplace, enter "NA" (not applicable).

g. **DATE COLLECTION BEGAN** -- Enter date sample collected or date sampling began (e.g., if Jan 14, 1994, enter 94/01/14).

h. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling began.

i. **DATE COLLECTION ENDED** -- Enter date sample collected or date sampling ended (e.g., if Jan 14, 1994, enter 94/01/14).

j. **TIME COLLECTION BEGAN** -- Enter local time (24-hour clock) when sampling ended.

k. **MAIL REPORTS TO** --

I. Your Office or Organization

a. Enter the mailing code (base code) for your particular facility, consisting of an alphabetical prefix, a number, and a suffix. If you are unsure of your correct mailing code, please call us at DSN 240-2061/2062 or commercial (210) 536-2061/2062. Failure to provide the proper mailing code may cause your report to be misrouted or delayed in processing.

b. The alphabetical prefix indicates your command. It is assigned by AL/OEBA and is used for radiological samples only at this time.

c. Numeric code (up to five digits) assigned to your base by AL/OEBA. This code should be referenced in all correspondence with the AL/OEBA.

d. The alphabetical suffix indicates a particular mailing address on your base. It is assigned by AL/OEBA.

II. **Copies To:** You can enter up to two additional address codes for duplicate copies of the reports, and we will mail them directly to your intended recipients (your command BEE? The base Civil Engineer?) If you wish to do this, please call us before the first time, so that we can make sure your intended recipient is in our data base, and give you the correct address code to use.

l. **SAMPLE COLLECTED BY** -- Enter name (last name, first initial), grade, and AFSC of individual collecting sample.

m. **SIGNATURE** -- Enter signature of individual collecting the sample.

n. **DSN** -- Enter DSN number of responsible individual who can answer questions that may arise from the laboratory concerning the sample.

o. **REASON FOR SUBMISSION** -- Select and enter code (from the boxes to the right) indicating the reason for submission. If "other" is chosen, please specify the reason.

RADIOLOGICAL SAMPLING FORM

PRIVACY ACT STATEMENT

AUTHORITY: 10 U.S.C 8013; Executive Order 9397.
PURPOSE: To collect information required to accurately assess dose due to radiation exposure and for entry of this information into the Air Force Master Radiation Exposure Registry (MRER) as required by 10 CFR 20.
ROUTINE USES: This information may be disclosed to the NRC for regulatory purposes.
DISCLOSURE IS VOLUNTARY: However, failure to provide the requested information will result in failure to accurately assess and post doses per 10 CFR 20.

PART 1 - ENVIRONMENTAL RADIOLOGICAL SAMPLES

MAIL SAMPLES TO:	WORKPLACE OR SITE	0	2	5	3	Q		A	X	X		1	2	3	V	0

MAIL SAMPLES TO:
AL/OEBA
2402 E DRIVE
BROOKS AFB, TX 78235-5114

BASE: KEESLER AFB	ORGANIZATION: SGPB
WORKPLACE OR SITE: 81 MDG WARD 2A	
BUILDING NO./LOCATION: BLDG 274, RM 69	ROOM/AREA: BACK

DATE COLLECTION BEGAN *(YY MM DD)*	TIME COLLECTION BEGAN *(24 HOUR CLOCK)*	DATE COLLECTION ENDED *(YY MM DD)*	TIME COLLECTION ENDED *(24 HOUR CLOCK)*
10 10 01	0630	10 12 01	1445

MAIL REPORTS TO *(USE ASSIGNED BASE CODE)*									
	ORIGINAL		0	0	0	9	3		81 MDG/SGPB 301 FISHEER ST
	COPY 1								
	COPY 2								

SAMPLE COLLECTED BY *(Name/Grade/AFSC)*	SIGNATURE	DSN NO.
AMN SMITH		555-6541

RADIOLOGICAL SAMPLING DATA

REASON SUBMITTED *(Select one)*			
A	A - ACCIDENT/INCIDENT	I - RCRA	N - NPDES
	E - EPA COMPLIANCE	K - RAMP	O - OTHER *(Specify)*
	F - FOLLOWUP/CLEANUP	C - COMPLAINT	

BASE SAMPLE NUMBER	G	P		9	4		0	1	1

COLLECTION METHOD
(Enter letter code)

C - COMPOSTE
G - GRAB
O - OTHER

SAMPLE TYPE
(Enter letter code)

X - AIR AMBIENT/GEN AREA	D - RESIDUE/ASH
Y - AIR EMISSION, SOURCE	L - SLUDGE
K - CHARCOAL CANISTER	S - SOIL
F - FOODSTUFFS	V - VEGETATION
G - GAS/AIR, COMPRESSED	T - WASTE, HAZARDOUS, TOXIC
M - INDUSTRIAL MATERIAL	N - WATER, NONPOTABLE
O - OTHER	P - WATER, POTABLE, NOT SDWA

ANALYSIS REQUESTED *(Specify radionuclides)* URANIUM 238 BY ALPHA SPECTROSCOPY

AIR FILTER DATA

VOLUME COLLECTED ______________ CUBIC METERS (M^3)

CERTIFICATION STATEMENT *"Based on my understanding of the origin of this sample and/or the process which generated it, I certify that to the best of my knowledge this sample contains no characteristic or listed wastes as defined by 40CFR261" (If the sample does, tell us the nature of the hazardous material).*

NAME	SIGNATURE	DATE
AMN SMITH		13 10 01

COMMENTS PLEASE FAX RESULTS.

RADIOLOGICAL SAMPLING FORM *(Continued)*

PART 2 - BIOLOGICAL SAMPLES

MAIL SAMPLES TO: **AL/OEBA** **2402 E DRIVE** **BROOKS AFB, TX 78235-5114**	WORKPLACE OR SITE		
	BASE	ORGANIZATION	
	WORKPLACE OR SITE		
	BUILDING NO./LOCATION	ROOM/AREA	
DATE COLLECTION BEGAN *(YY MM DD)*	TIME COLLECTION BEGAN *(24 HOUR CLOCK)*	DATE COLLECTION ENDED *(YY MM DD)*	TIME COLLECTION ENDED *(24 HOUR CLOCK)*

MAIL REPORTS TO *(USE ASSIGNED BASE CODE)*	ORIGINAL	
	COPY 1	
	COPY 2	

SAMPLE COLLECTED BY *(Name/Grade/AFSC)*	SIGNATURE	DSN NO.

RADIOLOGICAL SAMPLING DATA

REASON SUBMITTED *(Select one)*	A - ACCIDENT/INCIDENT	I - RCRA	N - NPDES
	E - EPA COMPLIANCE	K - RAMP	M- 10 CFR 20
	F - FOLLOWUP/CLEANUP	C - COMPLAINT	O - OTHER *(Specify)*

BASE SAMPLE NUMBER

COLLECTION METHOD *(Enter letter code)*

V - SINGLE VOID
T - 24 HOUR VOID
O - OTHER

SAMPLE TYPE *(Enter letter code)*

O - BIOASSAY/OTHER
B - BLOOD
E - BREATH SAMPLE
J - FECES
A - HAIR
H - HUMAN TISSUE/WBC
R - NASAL SWAB
U - URINE
Z - BREATHING ZONE AIR SAMPLE

ANALYSIS REQUESTED *(Specify radionuclides)*

SUBJECT NAME *(Last, first, middle initial)*	SSN

HEIGHT *(Inches)*	WEIGHT *(Pounds)*	DATE OF BIRTH *(YY MM DD)*	SEX	PREGNANT		ROUTE OF EXPOSURE	
			MALE	YES	N/A	INHALATION	INJECTION
			FEMALE	NO		INGESTION	ABSORPTION

ACUTE EXPOSURE DATA		CHRONIC EXPOSURE DATA	
DATE EXPOSURE *(YY MM DD)*	TIME EXPOSURE *(HHMM LT)*	DATE EXPOSURE *(YY MM DD)* START:	DATE EXPOSURE *(YY MM DD)* *STOP:*

NUCLIDE	INHALATION CLASS *(D, W, Y)*	CHEMICAL FORM AND PHYSICAL DESCRIPTION	PARTICLE SIZE *(IF KNOWN)*

COMMENTS